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Agricultural Outlook Forum'98

Speech Booklet 3

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Don C. Guess, Sr. Vice President, Agricultural Lending, First National Bank, Russellville, Arkansas

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VIABLE CREDIT FOR SMALL OPERATIONS

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Contract farming has allowed farm families to remain on the farm. It has given them an opportunity to create a viable business and accumulate wealth by using prudent management practices, and the expertise and guidance of the company technical advisors. It has provided a standard of living that would not have been available to them on their small farms.

In the early to mid-60's, the lock and dam across the Arkansas River was nearing completion along with Interstate 40. A lot of our rural people were without jobs and unable to be gainfully employed in the Arkansas River Valley area.

A retired vo-ag instructor, by the name of Harold Snyder, had a vision to expand his small company and increase his contract poultry production in the Arkansas River Valley.

In the early stages, there was no automation. Therefore, it took the whole family to take care of the poultry houses. In those days there were only chicken growers and it was considered a way of life. Today it has evolved into a big business with houses being automated with very sophisticated equipment. It is now considered a business and not a way of life. In the early 60's, poultry housing and equipment cost 50 cents a square foot. Today, housing and equipment cost \$5.75 a square foot.

We currently have 5,500 poultry producers and 340 contract swine producers in Arkansas.

A producer is able to get into business with a relatively small amount of investment or without having a large amount of operating capital. The company supplies birds, feed, medication and technical support. They also provide all the marketing for the finished product.

We have people who are handicapped and have no formal or very little education that are able to provide a living for their family, educate their children, and have a higher standard of living as a result of contract farming. If it were not for contract farming, a lot of these people would be forced to go on public assistance.

In the beginning, the company produced broilers and hunted a market. Today, the company produces for a market. Having the market in advance enables them to place birds into contract farmers' houses on a systematic time frame.

The producer or businessman can make plans as to diversifying his operation because he is assured

of five to six flocks per year, depending on the size of the bird produced.

The lender plays a vital role in the success or failure of this business. Many operations have failed because the lenders did not tailor the loan to fit the income stream and the needs of the farmer.

Five or six paydays a year will not match quarterly or monthly payments. If a loan is structured in such a manner, the farmer is unable to meet his obligations and becomes an absentee owner/operator on the farm and part-time jobs are needed to supplement the farm income. When this happens production levels of poultry goes down and income stream is also reduced.

It is also critical for the lender to work closely with the producer and tax preparer to make sure depreciation coincides with the amortization of their loan.

If accelerated depreciation is used then a lot of farms are forced to liquidate because the income stream is not sufficient to make payments, pay operating expenses, and income tax after buildings and equipment are totally depreciated.

Many farmers in our area have poultry houses and cattle as major sources of income. One member of that family works off-farm to help support family living. This is very common when the farm family wants to accelerate repayment of their farm debt. Then both members retire to the farm and have a very good income stream.

Most farmers do not have a conventional retirement plan, as most non-farm employment provides. This is a means of our rural families having a retirement plan.

Contract farming, be it swine or poultry, has its place in providing food for the world. With the producer, company, and lender working together as a team, it provides our farmers with a good business and not just a way of life. The largest single problem facing the company producer and lender is communication. If we could ever learn to communicate, we would solve most of our problems.

Recent Trends Affecting Farm and Rural Business Finance

by

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The availability and cost of capital are important factors affecting the viability and vitality of any sector of the economy. The relationship between the performance of the capital markets and the health of the local economy is especially important in rural markets which have historically lagged metropolitan areas both in time, and in the sophistication of capital products. Additionally, rural financial markets are more dispersed than their urban or metropolitan counterparts, and commonly used measures of concentration generally indicate less competitive rural lending markets, even though the evidence on cost and availability of debt capital is mixed at best. On the regulatory and policy front, there is a renewed emphasis in rural economic development programs, and yet many believe that rural capital markets are insufficient to fully facilitate the broad scale economic transformations they envision. At the same time, liberalized bank branching laws and the continued consolidation of the banking sector raise concerns about potential detrimental impacts on local economies – although again the evidence to date is mixed at best. Federal budget pressures, however, continue to limit the scope of direct involvement in traditional assistance programs in favor of indirect and guarantee programs. In any case, it is generally agreed that the rural financial sector is undergoing dramatic changes, and that the health of the markets it serves depends importantly on its ability to meet the challenges of the future. Thus, my charge today is to identify some of the more important trends affecting rural financial markets and the businesses they serve. Given the *Outlook* theme of the conference, I will try to distill some of the causes and consequences, and occasionally venture cautiously into predictions about how they may play out in the future.

But, before moving to the future, it is worth benchmarking today's situation in general terms. Of course, any generalization will miss cases on both sides of the standard, but according to many measures, the status of the rural economy is reasonably good. After the widespread economic downturn of the mid 1980s, the rural economy has made a nearly complete recovery. Nonetheless, concerns about returning to those historic conditions serves as a caution against abandoning efforts to improve capital markets still further. What are the important deficiencies of these capital markets, and what will be the future capital needs of rural America? Fortunately, much of the work to identify and answer those questions has already been begun. Time constraints prohibit my providing a complete summary, so I will first refer those interested in more information to the proceedings of a conference hosted by the Federal Reserve Bank of Kansas City entitled, *Financing Rural America*. The proceedings contain a collection of relevant

studies examining competitiveness of rural markets, prospects for secondary markets, liquidity and funding issues, and other factors that will accompany the resolution of its central question about what can and should be done to maintain and improve rural capital markets. At that conference, it was also noted that the rural economic health, though historically equated with agricultural conditions, now requires a much broader definition and it is this definition that I employ throughout as well.

Traditionally agricultural regions are beginning to diversify their economic bases, and the attendant capital needs for housing, business development, public infrastructure, and the like may place new demands on rural capital markets (Drabenstott and Meeker). The point I would like to make is that the current financial capital needs of rural America are much broader than the historic set of demands derived primarily from the farming sector alone. Likewise, the set of participants in the future will be broadened from the farmers, community banks, Farm Credit system institutions and rural non-farm business owners that might have historically served as a sufficient subject for this topic.

To organize my comments, I have loosely classified each of the factors and trends that I want to discuss into four general themes. Not all the factors and trends fit neatly into precisely one of the categories and thus, the classifications are interrelated and incomplete. Nonetheless, they serve as an organizing mechanism and hopefully are not too distracting from the points contained within each. The four themes are: 1) technological trends, 2) government, regulatory, and political environments, 3) social, demographic, and institutional factors, and 4) economic, business, and competitive issues including the structure and performance of the banking sector. Within each of these, selected, but not exhaustive lists of important forces are identified, and brief exposition given about their implications for the future. There are intermixed issues of both farm and nonfarm businesses within the rural boundary, as well as factors differentially affecting supply and use of different forms of capital (largely debt and equity). After these are presented, brief conclusions are provided.

Technological:

Remoteness and the “six clicks of separation”...

Though somewhat *cliche*, the much heralded information age holds the promise to radically affect – even redefine to some degree – rural economies. Advances in information and communications technologies have begun to redefine proximity in terms of the number of mouse clicks it takes to connect, rather than geographic distance. Drabenstott and Smith refer to “new spatial linkages” that can no longer be proxied by distance. It is this concept of “economic distance” or the difficulty in arranging transactions that could redefine rural not in terms of its distance to population centers, but in terms of the developments that facilitate transactions and information exchange. Lower costs information technologies also tend to reduce the minimum size of capital transactions since the lower, but still sunk cost of assessing a potential deal, doesn’t have to be spread out across as many dollars to dilute its effect to an acceptable level.

Information as a competitive tool, a two way street...

At the same time that consumers find it increasingly simple to shop large numbers of potential vendors via internet searches and the like, providers of financial services are increasingly

able to segment markets more finely due to improvements in information systems. Scanner data from grocery stores are routinely used to target consumers with personalized offers at a level of specificity that sometimes startles me by the accurate anticipation of future purchases. Can financial markets be far behind? Already there is a great deal of sharing of information between credit card providers and ancillary service providers based on the nature of the use of credit. And, improved score carding methods are being used that include more and more data fields and less and less requirements for local observable information. Thus, while information technologies reduce the economic frictions in typical financial relationships, they also lower the barriers for participation. The issue for rural financial market participants will be whether they can keep up and integrate the advantages of location with information that is no longer as confined by locale.

Payment and transaction systems...

As consumers become more comfortable with online payment and transaction systems, the location of the facilitating banking institution becomes less important. And, the costs per transaction continue to fall. To some degree, the differentiation between debt providers and other financial service providers gets blurred - particularly in terms of deposits and money accounts that then appear identical on the home office computer screen. Again, as the need for a local visible physical presence diminishes, local borrowers may enjoy improved access to new financial products and services.

Separation and blurring of traditional banking functions

Improved information technologies have also permitted an increasingly finer separation of the traditional banking functions. Origination may now more easily rest with vendors or point of sale locations, funding can take place on national markets, underwriting in a specialized organization, traditional backroom service providers may carry the transactions and so on. Likewise, regulation and oversight function should become easier as the reconnaissance can more easily be done remotely. In my own case as an example, my university paycheck is electronically deposited in a local bank, and a monthly automatic withdraw is made of a fraction that then goes to a money market fund in a local office of a national brokerage house. That account then pays a mortgage servicer at third bank that forwards it to the pooler that purchased my mortgage from a mortgage originator that I happened to locate by an internet search of FDIC reports based on loan to deposit ratios! My reason for searching? I was not satisfied with the very first bank's rates when I refinanced my mortgage that they formerly held. The reasons for this convoluted arrangement are a series of insignificant points in my own history, but I no longer have much concept of where institutional boundaries begin and end and each of these transactions was accompanied by benefits (not costs) for association with my business. More to the point, the market barriers in rural markets are likely falling as the capacity to enter those markets is improved with information technologies.

Scale Effects

Contrary to the previous point, there are significant scale effects that on their own present disadvantages to local providers in rural markets. This effect is distinct from the issue of whether community banks have sufficient capacity to fund large scale development projects.

My sense of what this means for rural markets is a general improvement in performance, by capital providers but I am actually a bit less optimistic that it will lead to a reduction in the “gap” between rural and nonrural markets. The technological half-life, it seems to me, is still generally underappreciated and I do not expect that rural markets will suddenly begin adopting new technologies at an increasing pace relative to non rural markets.

Government, regulatory, and political:

Rural agenda replacing agricultural agenda

Structural changes in the agricultural sector have been followed by a natural realignment of its political influence. No longer does the “farm bill” dominate the agricultural agenda, and the agricultural agenda itself has been somewhat redefined in terms of rural issues-in-the-large. Food safety issues now occupy an important part of the consumers’ collective consciousness about agricultural production as do environmental impacts associated with food production. A result of this political realignment there is feeling by many rural producers that their “efficiency” at producing low cost and plentiful food now requires that additional attention be devoted to safety, environmental sensitivity, and attributes that are now part of the regulatory environment rather than assumed features of their own ethic.

Declining direct involvement toward sponsored involvement...

Government budget pressures, while ever present, have recently been credited with favoring indirect over traditional direct government support programs in housing, agriculture, rural development, and so on. The bad news is that it is increasingly unlikely that a future rural decline would be accompanied by large scale infusions of capital from the federal government. The good news is that sponsored enterprises (including secondary markets in housing, and some targeted loan guarantee programs) have provided some great success stories. And, community based private market efforts to facilitate economic development likewise are beginning to flourish.

Liberalized bank branching and authorities....

There is a mixed message to rural economies from the results of liberalized bank branching and the continuing consolidation of banks, as well as from the continued relaxation of Glass-Steagall restrictions. Traditionally, local business (farm and nonfarm) have relied on local and community sources of debt capital. As more and more community banks are purchased by regional or national parents, or consolidated into more aggregated holding companies, questions arise about the impact on local availability and pricing of credit. The empirical evidence is mixed at this pint, but on balance suggests a slight destabilization of local availability and a reduction in business and agricultural lending (see Gilbert for summaries). Prospective studies likewise anticipate reduced lending to small businesses as banks are merged into larger organizations and become less dependent on local borrowers (Keeton, Berger, et al.). At the same time, affiliation with larger entities leads to improved funding and liquidity opportunities.

Agency market access for funding, liquidity – and distribution of authorities...

Perhaps the most controversial (a proxy for importance??) issue that will ultimately be resolved through the political process is through what mechanism, if any, will access to agency market funding be made available to rural markets and for what purposes. At the most general level, there are those who argue that the government backing on funding channeled through Farm Credit, Fannie Mae, Freddie Mac and so on is no longer needed while others argue that additional conduits to agency markets are needed to ultimately support business loans, rural infrastructure development and improvement projects and so on. The current policy debate, however, is much more specific. Even accepting that the role of a GSE is to fill a gap that exists when private market benefits are less than costs but for which the public costs are greater than the benefits, the question remains as to the mechanisms for doing so. In terms of lending to rural enterprises, there are current competing proposals to expand access to Federal Home Loan Banks by relaxing collateral and membership requirements, or expand the access to Farm Credit system funding by commercial banks. The political chess match has been made three dimensional by Farmer Mac's recent revitalization and arguments for expanded authority to further develop secondary markets in rural America. Regardless of your posture toward any of these most notable players, the empirical evidence of less reliable deposit-based funding is strong (see Barry and Ellinger for a more complete development). The "deposit drain" affecting rural community banks as individuals switch more and more toward money accounts and mutual funds at brokerage firms shows no signs of reversing. Thus, the resolution of this debate will, in all likelihood, fundamentally affect the structure of the financial industry lending to rural America. Still, the proposed policies focused on access to agency market funding have been difficult to resolve as much due to their competitive non-neutrality as to their economic desirability.

Social, demographic, and institutional:

Aging asset ownership of rural assets...

Although empirical support is sparse, concerns exist about the aging rural population in terms of asset ownership. Significant questions exist about the ability to facilitate the transition in ownership of closely held enterprises (especially farms and rural family businesses) and about willingness of a new generation of owners to commit to local communities. Although this is primarily an issue of size and form of business organization rather than location *per se*, the most vulnerable population is probably more concentrated in rural areas.

Environmental awareness - responsibility shifts...

The rural community is being increasingly held responsible for society's perceptions of the status of the environment -- and not just by farmers. Historically, the government was perhaps more heavily relied upon to regulate and insure that suitable protection standards were enforced. In the future, I suspect that one of the "products" of rural America will be an "environmental condition" that is acceptable to consumers of the remainder of rural America's products. Thus, more frequently in the future, public financing may be tied to a set of desired environmental attributes as a condition of the loan.

Regionalization of markets...

The livestock and dairy industries has witnessed massive shifts in the location of production units that have accompanied consolidation over the past decade. Manufacturing businesses likewise have regionalized to some degree. A seductive prospect for further rural development is sometimes posed in the possibility of attracting more manufacturing to non-metro locations although there is little empirical support for this prospect (Barkley). More likely are service industries, recreational facilities and “way of life” attractions – manufacturing requires plentiful and inexpensive labor – both rare attributes in parts of rural America.

Quality of life issues - labor, housing, health care, education...

A plethora of “quality of life” issues affect the future prospects for rural economic progress. The wish list, of course, involves a pristine accessible natural amenity with affordable high quality housing, quality health care, high quality education, low population externalities, and the like. Few locations possess each of these attributes – at least for very long! Still the point remains that development of nontraditional resources may hold the greatest promise for economic development in some rural communities rather than focusing on traditional agricultural and small businesses and light industrial firms to cause economic development.

Economic, business and competitive issues:

Consolidation of banking and production sectors...

In addition to the effects of a consolidated financial services industry, (see section on government, regulatory and political environment), the agricultural production sector continues to consolidate and move to production under contracted arrangements. Local community banks often find it difficult to lend to highly integrated operations due in part to the scale of the operations and also because the nature of these operations makes underwriting more complicated and involved. In many cases, additional equity is also needed in the “deal” and traditional financiers have served mixed roles in locating the complementing capital. As this trend continues, the local producers will increasingly rely on non-local sourcing of funds.

Agency market access and deposit drain...

The issue of agency market access (described briefly above) will in important ways determine competitive and cooperative relationships that hold the potential to significantly affect the structure of the market. In any case, a move away from deposit based funding of loans in rural America toward more securitized or agency funded sources is virtually insured. The result of more standardized and more securitizable loan products is largely a positive for borrowers – unless it arises solely as a result of the elimination of customized loan products. There will always be a role for the local lender to fill and increasingly, there are roles for non-local sourcing in developing rural enterprises as well.. My hope is that we don’t cut down the trees to get better access to the forest on this front!

Equity market developments...

For numerous reasons, equity markets have been slow to develop in agricultural assets in particular, as well as for small business needs. At the same time, aggregate equity positions in agricultural assets are extremely high in comparison to other sectors of the economy. As new,

more integrated, coordinated, and larger scale production units continue to form, there will be increasing pressure to develop functioning equity markets supporting agricultural and other rural businesses. My crystal ball doesn't project an image for much revolutionary change on this front however. Instead, I suspect that equity infusions will require complicated individualized efforts to arrange for some time into the future.

Non-bank banks....

An interesting development that may turn out to be an iceberg's tip is occurring with nontraditional capital suppliers. Increasingly and at an increasing growth rate as well, nontraditional debt providers are taking market share away from traditional lenders (Dodson). The most obvious examples involve firms like John Deere and J.I. Case which each run vendor finance operations and have developed huge lending operations originally to support their merchandising operations. Interestingly, Deere has begun funding the vendor finance operations of other agribusinesses and at least one cooperative as well. Apparently they have found a profitable niche and have begun filling it to the advantage of their eventual customers who are largely the same customers of traditional lenders. Less obvious are firms like Ag Services of America who in effect substitute their wholesale borrowing capacity for their customers' collective debt and re-lend on terms that facilitate their other businesses. Feed companies are likewise showing up in more and more financing deals either providing credit enhancements or direct quasi-equity stakes. One need only consider the growth of G.E. Capital, or major leasing and acceptance corporations to at least spur interest in the potential effects in rural America if non-bank banking finds niches in otherwise underserved markets. In this regard, what is generally viewed as more numerous market imperfections and inadequacies at least includes the potential to attract entrepreneurial solutions.

Concluding Comments:

Even though the current rural economy is enjoying relatively stable and prosperous times, there remains appropriate concern to avoid actions that could regenerate the economic turmoil of the 1980s. And, there is concern that while improving, the rural economy is losing ground relative to its non-rural counterpart (Duncan). The future path of many rural communities includes a more diversified economic base and more concentrated business structures – both of which require new and perhaps different forms of capital. At the same time, financial markets are consolidating and becoming less “local” or “community based”. On top of all of this, the government has adopted a posture of less direct involvement and has sent mixed signals about the future role and mechanisms for access to agency market funding for existing lenders. Accordingly, there are questions about the intersection of these trends. If capital providers are: (a) becoming less competitive at the same time that (b) governments are less active in developing new supporting institutions and (c) the needs of the customers are increasing and more specialized, then fairly bleak inferences could be drawn for the future of rural capital supply and use. On the other hand, if: (a) the evolution of the production sector is driven by efficiency and economic prospects, and (b) bank consolidations result in improved cost structures, and (c) the need for direct government involvement is declining, while (d) technologies are providing for broader, more uniform, and competitive access to a largely potential set of suppliers, then a contrastingly positive inference

can be drawn. There has been a great deal of empirical work investigating the causes and effects of each of these trends individually. Likewise, there have been highly qualified individuals assembled in conferences charged with addressing these same issues. On balance, the evidence suggests we are more nearly on the latter path although the prospects for broadening the economic base toward more industrialized manufacturing may be somewhat unrealistic for much of rural America. Fortunately, there does not appear, nor does the horizon seem to signal, a credit crunch in rural America. The local lenders face numerous constraints, and will continue to have liquidity and funding problems for managing asset-liability match, but the competing sources appear capable of filling in whenever gaps arise.

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**FINANCIAL PROSPECTS, BUSINESS ORGANIZATION, AND MANAGEMENT:
FARM BUSINESS CHALLENGES**

by

Jim Ryan, Dave Peacock, and Janet Perry

When we reviewed the farm financial situation at last year's Outlook Forum, we described a U.S. farm economy facing an encouraging future of greater access to an expanding global marketplace, facilitated by a new era of federal farm policy under the 1996 Federal Agriculture Improvement and Reform Act (the 1996 Farm Act). We described an evolving domestic and global agricultural policy era that would allow U.S. farmers additional freedom in making production decisions, and a global market that would present fewer trade barriers and enhanced opportunities to market that product. While increasing farmers' exposure to the risk inherent with greater market orientation, the approach has been advantageous for U.S. farmers over the past two years, as a robust domestic economy and strong export demand for our farm products has produced favorable farm prices and incomes.

Entering 1998, farmers are becoming increasingly aware of the added risk that accompanies greater market freedom. While events of the last few months have not dampened our expectation for a profitable, competitive U.S. farm economy, they have served notice that the road to farm sector prosperity will not be a straight line path of unbroken successes. Uncertainty in Asian financial markets and the slowing of economic growth in some of our trading partners have reduced demand for our farm products, while an excellent 1998 growing season in Argentina and Brazil has added to anticipated global supplies, and a strengthening dollar has made our goods more expensive relative to those from competing producers.

The purpose of this presentation is to report on the financial performance of the farm economy in the recent past, and to discuss its likely future performance, in light of the structural changes, organizational and financial, that are most likely to influence both the level and the distribution of farm sector income in the coming years.

Farm Income Outlook for 1998

A market-oriented farm policy presents added risks not only to farmers producing agricultural commodities, but also to those who would forecast the income of those farmers. We recently reported, both in the December 1997 issue of Agricultural Income and Finance: Situation and Outlook Report, and in the January 1998 Agricultural Outlook, that 1998 farm income was expected to rise slightly from 1997 levels, and, while not likely to equal the record set in 1996,

farm income prospects for 1997 and 1998 looked quite favorable. The farm income record set in 1996 was the result of good, though not record, production of major field crops and higher than average prices, which remained strong even after harvest. Cash receipts were expected to remain relatively high in 1997 and 1998, though not likely to repeat 1996 levels. Expectations for 1998 are periodically revised, and export and price data available since late fall suggest that cash receipts will be lower than previously estimated. Sales for several commodities, particularly hogs, soybeans, poultry, and wheat, will likely be below previous forecasts.

Net cash income, the return to farm operators from sales and other cash income minus out-of-pocket expenses, is expected to be about \$52 billion in 1998, down from \$55 billion in 1997 (figure 1). While substantially less than the nearly \$60 billion 1996 record, 1998 net cash income will be near the average for 1990-95 (\$53 billion). Net cash income, historically less variable than other farm sector income measures, is the best choice of indicators to gauge the funds available for family living expenses and retirement of debt. Including changes in farm inventories and non-cash income and expenses provides a projected *net farm income* of about \$46.6 billion in 1997 and \$43 billion in 1998. This figure is also slightly above the average for first half of the 1990's (\$43 billion), but substantially lower than the record \$52 billion for 1996.

The 1997 projection for *crop and livestock receipts*, based on production and price observations during the calendar year, is for a modest \$1.5 billion decline from 1996's record of \$202 billion (figure 2). Cash receipts for 1998, given present crop and livestock production and price expectations, are anticipated to decline \$2.3 billion from 1997's projection. Lower expected cash receipts for 1998 largely reflect the expectation of smaller returns for wheat, soybeans, and hogs. Cattle receipts are expected to increase by over \$1 billion in 1998.

Even with a slightly larger crop forecast, *corn receipts* for 1997 and 1998 are expected to be significantly lower than 1996 (figure 3). Corn receipts in 1997 fell by around \$3 billion, as 1997 corn prices, despite reaching their second highest level of the 1990's, averaged nearly \$1 per bushel below 1996 levels. Smaller exports also contributed to the lower corn receipts in 1997. Current expectations for a slightly larger 1998 corn crop, and prices similar to 1997, would yield corn receipts close to 1997's projection. *Wheat receipts* fell about \$1 billion in 1997 from 1996's almost \$10 billion. Production of wheat in 1997 was the highest since 1990, and as a consequence, prices were lower due to abundant supplies. With an average or better crop and increased stocks from 1997's large harvest, wheat prices and receipts are expected to be lower in 1998. Increased *soybean receipts* prevented total crop receipt forecasts from declining further in 1997 and are expected to add stability in 1998. Soybeans earned close to \$2 billion more in 1997 than the record \$16.2 billion in sales obtained in 1996. The 1997 increase follows the upward trend of soybean receipts occurring throughout the 1990's. With the largest acreage ever planted to soybeans (70 million) there will be record 1997 production to sell. Yet even with the larger crop, prices have remained fairly strong after the harvest. A vigorous export market contributed to the increase in soybean receipts for 1997, which is projected to be the third best export year on record. A return to average output and slower international trade in 1998 could lead to a decline of \$1 billion in soybean receipts.

Livestock receipts in 1998 will be about \$1 billion below the \$93 billion attained in 1996 and 1997, due mainly to a \$2 billion decline in hog receipts (figure 4). Hog production is expected to continue rising through 1998. Even with lower expected prices, hog receipts in 1997 remained roughly \$12 billion, the level achieved in 1996. Smaller anticipated pork exports to Asian markets are a factor in lower projected pork prices. After a steady decline during 1994-96, cattle and calf receipts increased by \$2.5 billion in 1997, and are expected to rise another \$1 billion in 1998. Poultry receipts in 1998 are expected to remain near the 1997 level of \$21 billion, as slight increases in broilers offsets declines in turkeys and eggs.

Already a relatively small portion of cash sources of income (3.3% in 1996), *direct government payments* are expected to begin declining in 1998. In 1997, payments represented a mixture of funds from former commodity programs and disbursements based on production flexibility contracts as provided for in the 1996 Farm Act, including advance payment for 1998. Payments received in 1998 are governed by the new legislation, and total government payments will begin to follow the declining levels allocated for production flexibility contract payments through the year 2002.

Total farm production expenses increased about 2.7 percent (\$4.8 billion) in 1997, the smallest rise since total expenses decreased slightly in 1992 (figure 5). From 1993 through 1996, total production expenses rose \$6.7-\$7.6 billion (4-5 percent) each year. In 1998, in response to slightly lower planted acreage and a fall in the number of cattle on feed, total outlays are forecast down around \$600 million dollars, a decrease of around 0.3 percent. This would be the first decrease in total farm production expenses since 1992. The robust domestic economy, with its anticipated low inflation, stable interest rates, and favorable oil prices, will help contain farm production costs.

Farm Assets, Debt, and Equity Continue Upward Through 1998

The value of U.S. farm business assets is expected to exceed \$1 trillion in 1997 and continue growing through 1998 (figure 6). The value of farm real estate, the largest share of the sector's assets, increased 5.9 percent during 1997. Reflecting the favorable long-term prospects for the sector, farm real estate values are expected to grow by 5 percent in 1998. Farm business debt is expected to grow a little over 3 percent in both 1997 and 1998. The combination of strong growth in the value of farm assets and a modest expansion in farm debt indicates a rising net worth (equity) for the farm sector in 1997 and 1998.

Farm business debt is projected to reach \$162 billion by the end of 1997, and to rise another 3 percent in 1998. Rising debt levels do not signal pending financial distress in the farm sector. Despite the increase in debt, farm business balance sheets have shown steady improvement throughout the 1990's. Debt-to-asset ratios have improved, as the 16-percent increase in farm business debt from 1992 through 1997 has been more than offset by the 25-percent rise in the value of farm business assets.

The expected rise in *farm business equity* in 1998 reflects the increase in farm asset values relative to the rise in farm debt. In today's dollars, \$1.083 trillion in assets minus \$167.6 billion in farm debt yields a sector net worth of nearly \$964 billion. Farm sector equity by the end of 1998 is expected to be almost \$90 billion more than in 1996, and over \$300 billion greater than in 1985.

Indicators used to measure the solvency of the farm sector remain favorable for 1997 and 1998. The *debt-to-asset ratio* indicates the relative dependence of farm businesses on debt and their ability to use additional credit without impairing their risk-bearing ability. The lower the debt-to-asset ratio, the greater the overall financial solvency of the farm sector. The debt-to-asset ratio is forecast to be 14.8 percent in 1998, down slightly from 15.0 percent in 1997. Over the last decade, this ratio has been declining steadily from 23 percent in 1985 to 15.6 percent in 1995.

Current income rates of return on farm assets and equity, indicators of the profitability of farm sector investments, remained near 1996 levels in 1997. Total *returns on farm business assets*, including capital gains, declined from 6.5 percent in 1996 to 5.7 percent in 1997, derived from 3.7-percent growth in current income and 2-percent growth in capital gains. Total returns on farm business assets are forecast at 5.2 percent in 1998, reflecting both the lower expected returns to farm assets from current income and somewhat slower appreciation in farm asset values.

Impacts Vary by Type of Farm

For most farms in most areas, 1996 was an exceptional income year. The projected 9-percent decline in sector-wide net cash income in 1997, followed by an additional 3-percent decrease in 1998, will not be evenly distributed across all U.S. farm operations. Changes in cash receipts drive changes in net income for farm operations producing those commodities. Only cattle producers, coming off the lows of 1994-95, are expected to see measurable increases in their net cash incomes in 1998 from 1996. Producers of tobacco, and speciality crops such as fruit, vegetable, greenhouse, nursery, and other livestock may have modest increases while producers specializing in wheat, corn, cotton, hogs, and dairy are expected to experience drops in net cash income from farming from 1996 to 1998. Farm operations specializing in production of these commodities will likely begin to feel additional financial stress in 1998, especially if they entered the year with a substantial debt load to service.

The changes in distribution of income among farm types reflect the beginnings of a geographic shift in the distribution of production in response to elimination of direct Government commodity support programs and changing consumer preferences (figure 7). Increased market reliance is expected to shift production of commodities among states based on comparative advantage. Acreage of corn planted in seven Midwestern states (OH, IN, IL, WI, MN, IA, NE) increased in 1997, and accounted for two-thirds of all corn acres planted, while acreage planted in nine Southeastern states (TX, LA, AR, MS, TN, AL, FL, GA, SC) declined nearly 10 percent from 1996, as farmers responded to greater planning freedom by increasing acreages of soybeans and other crops.

Farm Borrowing Increase Does Not Signal Rise of Financial Stress

The recent and projected increases in farm business debt are relatively small compared with annual changes during the 1970s, when outstanding loan balances grew at an average annual rate of over 12 percent (figure 8). Thus, farm operators' expanding use of credit is not expected to place excessive demands on their ability to service debt. Farmers are expected to use their available credit lines more fully in 1998, as evidenced by the rise in *debt repayment capacity utilization*. (figure 9) For farm operators, income available for debt service can be used to determine the maximum loan payments a farmer could make, which determine the maximum debt that a farmer could service, given current market interest rates and an established repayment period.

Farm debt repayment capacity use (actual debt expressed as a percentage of maximum feasible debt) effectively measures the extent to which farmers are using their available lines of credit. In 1998, farmers are expected to use available credit lines more extensively. Use of debt repayment capacity rose from 45 percent in 1993 to 56 percent in 1995. Despite the 1996 rise in farm business debt, high net cash income levels and lower interest rates resulted in a drop in use of debt repayment capacity to 49 percent. The effects of expected favorable interest rates throughout 1997 and 1998 will not be sufficient to offset the combined effects of rising debt and lower net cash income, which was reflected in the rise of debt repayment capacity utilization to 56 percent in 1997. Farmers are expected to use about 61 percent of the debt that could be supported by their current incomes in 1998. While this indicator will reach its highest value since 1986, it remains substantially below the levels attained during the widespread farm financial stress of the mid 1980's.

Most Farm Households Receive Substantial Off-farm Income

Most farm households rely heavily on off-farm income because their farms are too small to support a modern standard of living. Since the official definition requires an operation to have only \$1,000 worth of agricultural sales to qualify as a farm, a large number of rural households are classified as farm households despite very low or negative farm earnings. Limited sales typically result from only modest resources being devoted to farming or from a low return on farm assets.

USDA's Agriculture and Resource Management Study indicates that, on average, farm operator households received only 16 percent of their 1996 income from farming (figure 10). Their household income from both farm and off-farm sources, however, averaged \$50,361, similar to the \$47,123 average for all U.S. households, while those operating farms with sales of at least \$50,000 received 55 percent of their income from farming, earning an average of \$40,623 from farming activities. These farms' total household income averaged \$74,519, or 58 percent more than the average for all U.S. households. These households, however, accounted for only about 26 percent of all farm households.

Households operating farms with sales less than \$50,000, which made up 74 percent of all farm households, relied on off-farm sources for virtually all of their income. On average, farms with less than \$50,000 in sales lost money farming, but received \$45,418 in off-farm income. Wages and salaries were the largest component of their off-farm income and accounted for 61 percent of their total off-farm income. Because of their off-farm income, the total average household income for this group of farms was near the average for all U.S. households.

Average operator household income projections for 1997 and 1998, in nominal terms, are not significantly different, statistically, from 1996. The forecast decline in earnings from farming would be expected to have the greatest effect on households most dependent on farming for income, which are typically those operating larger farms. Households operating smaller farm businesses will continue to rely heavily on off-farm income, particularly wages and salaries, for their livelihood. Fortunately, the demand for rural workers has been strong since the 1990-91 recession, with the tighter rural labor market resulting in higher real wages.

Baseline Projections

Longer Term Farm Income and Farm Financial Conditions

Farm income prospects for 1997-2007 appear favorable, although not buoyant, at this reading of the key factors influencing sector receipts and expenses (figure 11). Net cash income through the end of the millennium, and into the early 2000s, is projected to hover around \$56-57 billion. At this level net cash income will average higher than the first half of the 1990s (\$53 billion for 1990-95), but fall below the record \$60 billion achieved in 1996. If current expectations prevail, a steady growth in net cash income will begin in the early 2000s, eclipse the 1996 record, and continue until the end of the baseline. The rate of projected growth over the baseline period (1997-2007) is a modest 2 percent per year. With an expected inflation of 3 percent annually, the sector's inflation-adjusted net cash income by the end of period could be lower than achieved in 1997. The implication is that real net cash income in the future, unless key variables change notably, is expected to not look much different than it does today.

The baseline projections of net farm income are an abstraction from the substantial variability typical of this measure, which, through incorporation of inventory adjustments, reflects more fully the impact of annual swings in production and prices. Since annual variations in weather, crop yields, and indirectly market prices cannot be foreseen, projections of net farm income are represented as a slow but steady rise to end of the base line period. Net farm income is projected to be higher than the early 1990s (\$44 billion), but not reaching 1996's record of \$52 billion until well into the baseline period. The rate of increase projected is approximately 2.5 percent, marginally lower than the expected rate of general inflation. In real terms, then, net farm income in 2007 may be little different than it is today.

In 1994, crop sales surpassed livestock sales as the largest source of receipts and is projected to remain so throughout the baseline period. The dollar value of crop receipts is projected to rise at a rate of 2.7 percent per annum. But with 3 percent inflation, the real value of crop output is

declining slightly. The lack of growth in the real value of crop receipts reflects declining real prices. The quantity produced of major crops, such as corn, wheat, soybeans, and cotton is expected to increase over the baseline period. The trends projected for these commodities indicate that production will reach or exceed each of these commodity's record output by the end of the baseline period. Consequently, while crop output can be expected to expand, the larger cash receipts (in current dollars) will not likely be reflected in significantly larger real farm income.

Livestock receipts are expected to grow steadily, 2.4 percent annually, for a total of 27 percent over the baseline period. The overall rate of growth in livestock receipts is slightly slower than crops. Cattle and broiler receipts are projected to increase faster than dairy products, eggs, and hogs. The expected results of the cattle cycle during the baseline period is for a short-term decline in commercial beef output offset by higher prices, followed by both output and prices drifting upward toward the end. Commercial beef output is not projected to reach as high, nor are prices expected to fall as low, as occurred in 1996. A steady rise in broiler output underlies the projected rise in broiler receipts. By contrast, the expanded output of hogs expected during the first half of the baseline is foreseen as pressuring prices downward, resulting in lowered receipts to hog producers over much the 1997-2007 period. In real terms, the changes in livestock receipts projected for the baseline will not contribute to increasing real sector income.

Direct government payments are expected to trend downward. Payments in 1998 will be governed by the 1996 Farm Act, and total government payments will begin to follow the declining allocations for production flexibility payments through the year 2002. Almost all government payments are from production flexibility contract payments or Conservation Reserve Program (CRP) payments. The baseline assumes that production flexibility contracts payments continue at their 2002 levels beyond the expiration of the 1996 Farm Act. CRP enrollment is nearly flat after 2000, so CRP payments are relatively constant in those years. Beyond 2000, direct Government payments account for less than 3 percent of gross cash income, the lowest share since 1982. Thus, the farm sector increasingly relies on the marketplace for its income.

Total cash expenses grow moderately, at a projected 2.5 percent over the baseline. Expenditures for farm-produced inputs -- feed, feeder livestock, and seed -- show the least upward movement. Farm origin expenses, which represent about a quarter of cash farm production expenses, increase at an average rate of about 1 percent per year. The generally slow rise in farm product prices is also reflected in the prices of farm-origin inputs. Manufactured input expenses rise more rapidly (3 percent), near the pace of inflation. Interest expenses appear to represent a nearly stable share of cash expenses (about 8 percent) throughout, although interest rates on agricultural real estate loans rise slightly. Labor costs, which account for approximately 12 percent of cash expenditures, are projected to be the most rapidly rising expense item. Even so, labor expenses are projected to rise at about the rate of inflation.

Baseline farm business asset values rise at a slower pace than recent history, mostly reflecting increases in the value of real estate assets. Farmland values have risen at about 6 percent annually since 1993. Farm real estate values are forecast to rise 5 percent for 1998. The projected rate of

increase in land values for the baseline is 4 percent, slightly above the inflation rate. Farm debt is projected to grow at an even more modest rate, reducing average debt-to-asset ratios to below 13 percent by 2007. Total farm business debt rose an average 3 percent during 1994-1997 and is projected at 2.4 percent over the baseline. Real estate debt is projected to rise slowly (2 percent per year), reflecting the present conservative attitude of farm operators toward borrowing to expand their basic resource base. Nonreal estate debt, a large share of which is turned over annually financing production expenditures, appears to rise slightly faster than the overall increase in cash farm expenses. With larger increases in farm asset than farm debt, farm equity rises during the baseline.

Structural Changes, Environmental Considerations

Over time, farmers' expanded freedom in producing to meet the demands of a competitive global marketplace, and their need to mitigate its inherent risks, will underpin structural changes already underway in the U.S. farm economy, as the number of farms continue to decline, the size of remaining operations continue to expand, and smaller operations increasingly rely on non-farm sources of income. Competition will maintain pressure on farm operations to contain costs, and to expand operations to take advantage of size economies that lower per-unit production costs. Environmental considerations may ultimately limit the size of farm production units. As livestock operations become more fully integrated, further expansion may be limited by local concerns over the environmental impacts of large animal populations on both air and water quality.

Cost Containment Remains Key Long-Term Factor

Several years ago, we identified cost containment as a critical factor relating to the long-term financial well-being of the farm sector. The relative strength of the U.S. economy and currency in increasingly competitive global markets will place continuing pressure on domestic prices and operating margins, making cost containment even more critical today and in the future. As operating margins tighten, reductions in per unit costs of output will be necessary to compete in world markets. Even with modest productivity gains, there will be increasing pressure either to expand farm size in order to spread costs over more units of output, or to adopt new technologies and production practices. Those operators unwilling or unable to expand will face even greater pressure to contain costs by farming in the most economically efficient manner. The availability and adoption of technological advances will continue to be an important factor in reducing per unit costs of production.

Data obtained in the 1996 ARMS indicate that cost-size relationships do exist for most types of farms (figure 12). Lower costs per unit of production do appear for larger farm operations, particularly for those specializing in the production of dairy, beef, corn, fruits and nuts, or vegetables. For example, corn farms with sales over \$1,000,000 had operating profit margins of 34 percent, and average unit costs of \$.70 per \$1 of output, while those with sales between \$250,000 and \$500,000 reported margins of 19 percent, and unit costs of \$.87.

Multiple Entities Share in Farm Operations' Ownership, Management, Risk, and Income

Traditionally, the farm sector has been viewed as a one farm, one operator paradigm. That view is becoming increasingly clouded, especially for larger and industrialized farms, where multiple parties share asset ownership, risk, income, and expenses related to the operation of the farm business. Methods used by farmers to acquire operating and other inputs vary by type, size, and location of farms and by characteristics of farm operators. These methods, ranging from outright purchase to complex leasing and contract arrangements, determine which providers are paid from operating income or other funds, and which providers share in the farm's net income. Sharing in the farm's business and financial risks is a characteristic that distinguishes between those input providers receiving a share of net income, and those whose inputs are treated as production expenses.

A farm operator's claim on a farm's net income is based on the ways the business secures its assets. Farmers use equity capital from a variety of sources. For example, they may use savings to buy land, equipment, or other inputs. Here, farmers would claim all the income earned from the use of the assets. Single-family farms, where the farm operator provides all the farm's assets and retains all the farm's net income, still dominate farm numbers. Single-family farms accounted for almost three-quarters of farms, however, these farms accounted for about one-third of the value of production.

More and more, a farmer's funds are combined with capital from outside the immediate family. Farmers get equity from a variety of arrangements, including partnerships and corporations, pooled funds, joint ventures, or co-ownership (including contracting) of either assets or commodities. In addition to family members, farm implement suppliers, merchandisers, processors, distributors, and other furnish resources to production agriculture. Those who share in net income also bear some of the farm's production risks. In twenty-five percent of farms, equity capital was received for use in production from multiple persons, households, or businesses (figure 13). Farms with these complex organizations produced more than 2/3 of the value of farm output.

Industrialization and Risk Management

Historically, farm operators have reduced risk by producing a diversified mix of crop and livestock enterprises. The food marketing system is evolving from one producing coarse commodities for bulk markets to one creating consumer products for specified markets. Control of input usage, maintenance of product quality, and attainment of economies of size in production will require greater coordination of the various stages of agricultural production and processing, and greater specialization in individual stages by each participant.

Increased coordination is evidenced by the rising use of production and marketing contracts, and the rising degree of coordination between contractors and contractees. While the importance of contracting varies among commodities, almost one-third of total value of 1996 U.S. farm output

was produced under a marketing or production contract (figure 14). A higher degree of vertical coordination will allow farmers to spread risks vertically throughout the coordinated farm-to-market production process, as contractors and integrators absorb some of the price risk. Income variability may be reduced for contractee farmers, as they become more specialized producers receiving fee income based on their contribution of service to a production stage within a coordinated production system.

Contractors are providing a larger share of inputs used in farm production of certain commodities. In return, contractors pay the farm operator a fee for the labor, management, facilities and other inputs that the farmer supplies. Contractors typically bear a large share of production and price risk, and earn the majority of net income from the commodity's production. In exchange, farmers may be able to expand their operations more rapidly than otherwise possible, and perhaps, with less debt and fewer financial risks. The proportions in which costs and revenues are shared between farmers and their contractors varies among commodities and generally depends on the amount of input and managerial oversight provided by the contractor.

Farmers' Adaptations to the 1996 Act and Beyond

The challenges facing agriculture will change the way that farmers manage their businesses. Much interest has focused on producers' adaptations to the 1996 Farm Act, and on their use of alternative risk management tools. As the sector relies more on market forces, we recognize that farmers face an increased risk of business failure, as well as increased opportunity for success.

As farm income becomes more variable, risk management becomes more important. As supply or prices of products change, new technologies are adopted, or environmental constraints appear, farmers could experience higher (or lower) income, cash flow difficulties, changing expenses, or more debt exposure. While aggregate income for the sector, or the average net income per farm, could remain stable, variability in income for individual farmers could increase. The probability of extremes in receipts, both high and low, requires farmers to plan more carefully their finances, and production and marketing of goods.

USDA's Agricultural and Resource Management Study shows that indeed farmers are examining ways to respond (figure 15). In 1996, the latest year for which data is available, approximately 20 percent of producers either changed their management decisions or were considering a change, as a result of the new farm legislation. Strategies included in farmers' adjustments were diversification of commodities, forward contracting, hedging, and keeping an open line of credit. Farmers growing program crops (those most affected by changing policies) were, in general, continuing to use the same level of management under the new legislation. Of those who had modified their management strategies, most were considering the use of contracting, diversification and hedging. Operators reported increased adoption of three strategies: maintaining a credit line, keeping cash reserve, and spreading sales over the year. Program crop farmers were using custom work less, perhaps because they were changing their mix of crops. While it is still too soon to project long-term changes in farm operators' risk management

strategies that will evolve under a policy of greater market freedom, the 1996 ARMS provides a initial benchmark for following farmers' risk management behavior over time.

Closing Points

The Short-Term Outlook

- o Farm income prospects are strong for 1997 and 1998, but not equal to 1996 record.
- o Cash receipts expected to decline in 1998.
 - lower soybean and hog receipts.
 - higher cattle receipts.
- o Exports expected to contribute less to farm income in 1998.
- o Most farm households rely heavily on off-farm income.
- o Farm assets, debt, and equity continue to grow through 1998.
- o Farm operators use of debt repayment capacity rises due to lower income and rising debt.

Longer-term Projections

- o Farm income expected to rise at about 2.5 percent.
- o Inflation expected to rise at about 3 percent.
- o Farm sector will face low real growth rates.

Sector Continues to Face Structural Changes

- o Cost containment essential in competitive global markets.
- o Multiple entities share risk as well as income.

Figure 1

Farm income will be about average for the 1990s

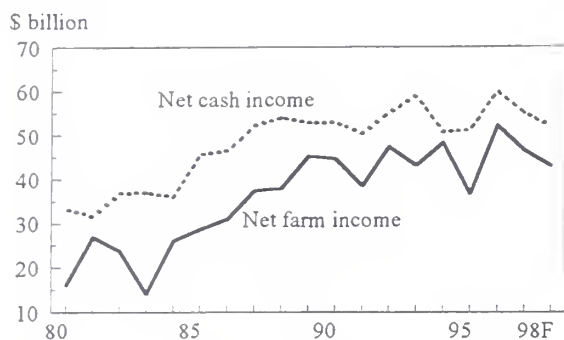


Figure 2

Crop receipts continue to exceed livestock

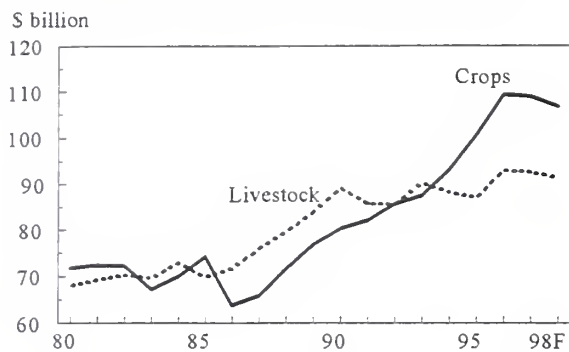


Figure 3

Crop receipts are expected to be lower

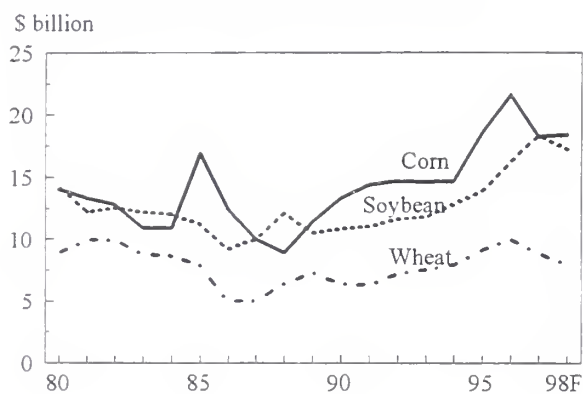


Figure 4

Lower hogs receipts offset rising cattle receipts

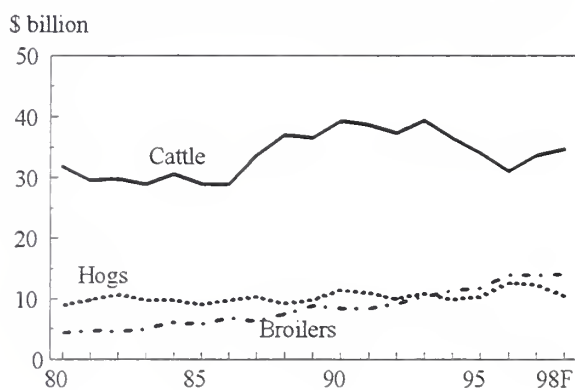


Figure 5

Production expense expected to decline slightly

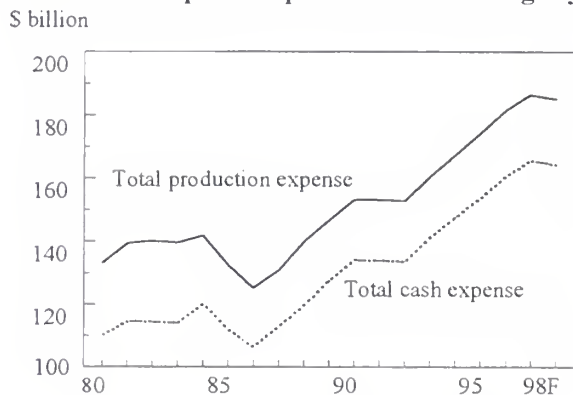


Figure 6

Farm assets, debt, and equity all rising

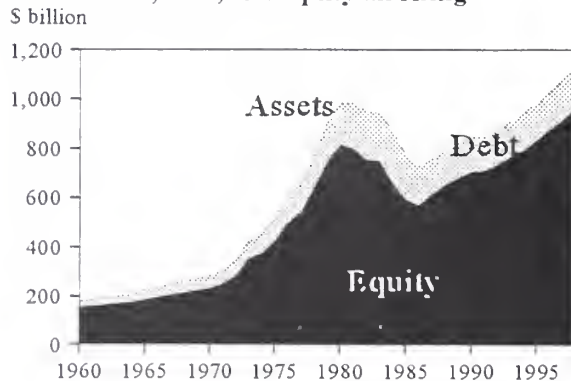
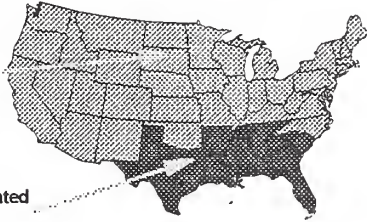


Figure 7

Regional Concentration of Production ?

In 1997, these 7 states accounted for two-thirds of acres planted to corn. Acreage planted increased from 1996.



In 1997, acreage planted to corn declined by nearly 10 percent from 1996.

Figure 8

Year-to-year to changes in farm debt Percent

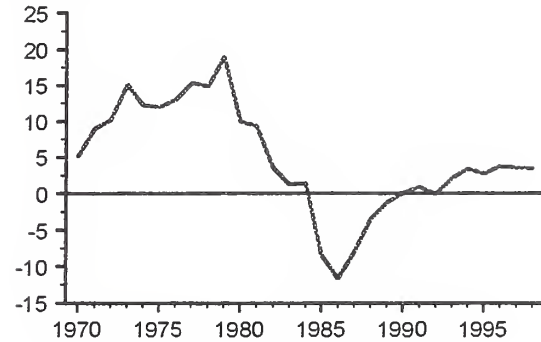
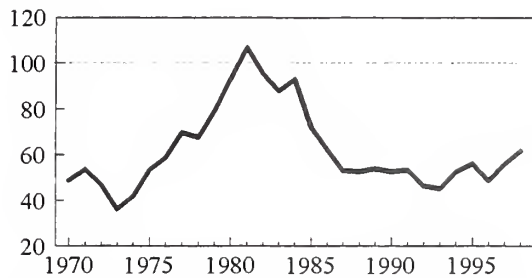


Figure 9

Debt repayment capacity utilization expected to increase in 1997-98

Percent



Actual debt compared with a hypothetical maximum debt that could be carried based upon repayment capacity.

Figure 10

On average, the households of small farms depend heavily on off-farm income, while the households of larger farms depend mostly on farm income.

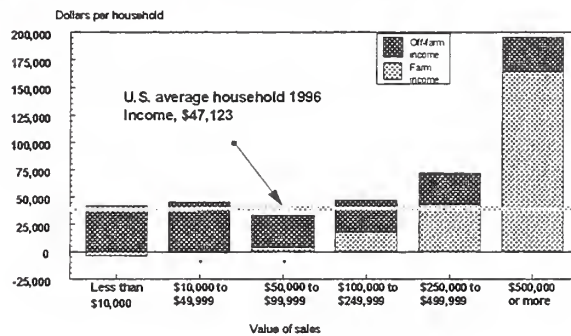


Figure 11

Farm income increases slowly over the baseline period

\$billion

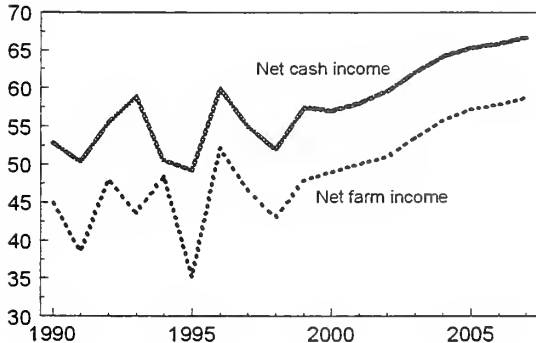


Figure 12

Larger corn farms produce at lower costs

Economic cost per dollar of production

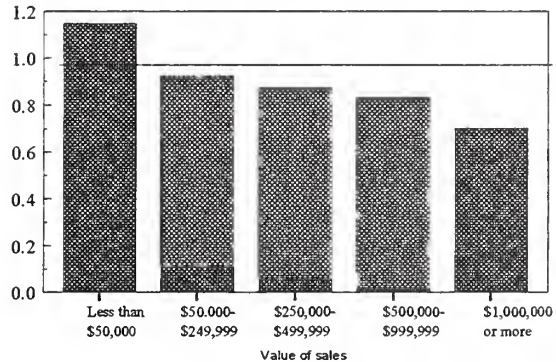


Figure 13
Farming is dominated by single-family farms
But, farms with multiple input-providers control more production relative to their numbers

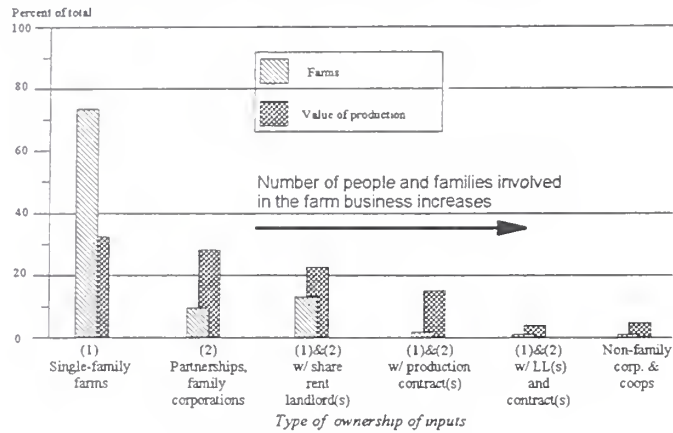
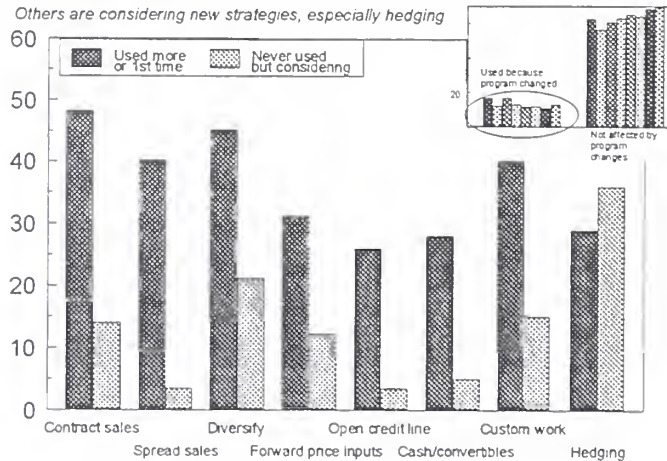


Figure 14
Production and marketing contracts, 1996

| | Percent of contracts | Percent of production |
|-------------|----------------------|-----------------------|
| Total | 100.0 | 33.0 |
| Wheat | 2.1 | 12.9 |
| Corn | 7.3 | 17.7 |
| Soybeans | 5.0 | 17.4 |
| Fruits/nuts | 8.8 | 52.9 |
| Vegetables | 8.5 | 47.1 |
| Hogs | 4.4 | 32.1 |
| Poultry | 27.0 | 94.1 |

Figure 15
Farm program changes led to increased use of selected strategies
Others are considering new strategies, especially hedging



Available Navigation and the Incremental Cost of Railroad Capacity: Preliminary Lessons from the Upper Mississippi Basin

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February, 1998

Introduction

Good afternoon, As my remarks will make clear, I am *not* an agricultural expert. I am, instead a transportation economist who deals regularly with the movement of agricultural and other dry-bulk commodities. Even, however, as a relative outsider, it seems clear that the agricultural community faces an abundance of both opportunities and challenges. Productivity or yield estimates for the coming decades indicate that the American farmer, more than ever, will be able to supply copious volumes of food to domestic markets and to the international community as a whole. On the other hand, many of us have heard compelling arguments that suggest that the ability of American agriculture to compete in international markets will depend heavily, not only on our ability

¹ While the research described herein was funded by the U.S. Army Corps of Engineers and performed by the Tennessee Valley Authority, the opinions and conclusions contained within these remarks do not necessarily reflect the position of either.

to grow food, but also on our ability to efficiently move agricultural outputs from the field to export destinations. In short, if America is to retain or expand its place in world markets, it *must* simultaneously improve and expand its transportation infrastructure.

Arriving at this realization is the first and simplest step in the journey toward continued prosperity in the agricultural sector. Moving, beyond this initial awareness, however, toward an adequate assessment of transportation infrastructure capacity, future capacity needs, and the appropriate policy course is a tedious, even torturous, process that requires a great deal of input from a variety of academic and professional disciplines. Moreover, even when the best possible expertise and information are gathered together, uncertainties regarding the magnitude of expected demand and the actual cost of developing new capacity make reliable answers difficult to come by. In short, anyone who claims to *know* the correct answers is, more than likely, seeking only to further some narrow agenda and is not someone to be trusted. Having offered this warning, I'll spend the remainder of my time today discussing the issues that surround transportation capacity needs. Within this discussion, I'll provide an example of how I and my colleagues are attempting to develop information that will shed at least a little light on a few of these issues, and finally, I will offer a few preliminary conclusions

Future Transport Capacity: Framing the Challenge

The first step in assessing available transportation capacity and determining the best possible way of providing for future transport infrastructure needs is to ask the right questions. The relevant queries actually fall into two broad groupings. The first area of interest revolves around whether or not there is sufficient competition and little enough baggage, so that we may reasonably expect freely operating transportation markets to provide us with the best available outcome. If there is effective competition within and between transport modes and if informational problems and environmental concerns are satisfied, then the need for aggressive public policy may be minimal. Alternatively, if relevant transport markets are marked by monopoly control or if externalities or other market failures are ignored, then the configuration of the transportation infrastructure that

results from unfettered market interactions will almost certainly be undesirable and the public good will be ill-served by a hands-off policy.

I've studied the conditions that lead to effective transportation competition at length and have, likewise, worked to integrate environmental concerns into ongoing transport analysis, so that I am convinced that we are making progress in addressing this first set of issues. I am also firm in my belief that the level of transport competition and the determination of the appropriate public response are concerns that demand continual vigilance. This is not, however, the topic of my remarks today.

The second broad area of concern - the one that has motivated the research that I will describe momentarily - is defined by questions regarding the actual physical capacity of existing transportation infrastructures and inquiries regarding the incremental cost of expanding that capacity to meet growing transportation demands. In short, even if questions regarding the adequacy of competition are satisfied, can we build what we need at a cost that will allow us to compete in world markets or will the incremental cost of new capacity lead to increased transport rates and a diminished comparative advantage in world markets? It is a frightening question to ask, but one that demands an answer.

The Incremental Cost of Transportation Capacity

To understand the relationship between incremental capacity costs and currently observed transportation rates, we need only think back to our school days. A "C" student faced with a prospect of a "B" course grade is likely to be pleased with his accomplishment. This is true, in large part, because the inclusion of the incremental grade (course grade) into his overall GPA will produce a new and somewhat higher average. Alternatively, an "A" student who receives the same "B" is likely to be disappointed - not only because her performance was not up to usual levels, but also because the substandard incremental performance will pull *down* her aggregate GPA. Thus, we see that it is not just the cost of new capacity that matters, but the cost of that new capacity *relative* to the capacity costs already embodied in transportation rates that really matters. Still, the more

cheaply we can place the additional infrastructure needed to accommodate growing demand, the more likely it is that the incremental cost will be less than currently embodied capacity costs, thereby resulting in declining transport rates.

The Upper Mississippi Basin and the Challenge of Measurement

How do we add new capacity as cheaply as possible and will the price tag be low enough? In a sense the U.S. Army Corps of Engineers' complex process for evaluating proposed navigation improvements amounts to an elaborate attempt to defensibly answer the first part of that question. The Corps assesses demand growth, then considers how that growth will impact barge operating costs and observed rates both with the proposed project and without it. In doing so the traditional assumption has been that traffic, diverted from the river, can be placed on the rail network either (1) without the addition of new railroad capacity or (2) with the addition of new capacity that can be brought on line without affecting railroad rates. Thus, the cheapest way of adding new transportation capacity (and, ultimately the criteria for judging the desirability of navigation projects) depends on whether the incremental cost of adding new navigation capacity is less than or greater than the average capacity cost already embodied in railroad (or trucking) rates.

In many settings the simplifying assumption of constant railroad capacity costs has a benign impact on the ultimate policy decision. Within the context of upper Mississippi River navigation, however, where hundreds of millions of tons of barge traffic could potentially be diverted onto the rail network each year, the assumption of constant railroad capacity costs is, at best, unnerving. Fortunately, the same Corps guidelines that impose the traditional assumption of constant railroad capacity costs also allow for an investigation of the matter if conditions are judged to warrant it. It was the Corps' conclusion that upper Mississippi navigation provides precisely the circumstances under which the validity of the traditional assumption regarding modal capacity must be investigated. The steps to be followed are quite easily enumerated -

- **Measure** the current capacity of the network of line-haul segments and terminals that constitute the nation's rail system.
- **Measure** the incremental capacity that would be needed on the various line-haul segments and at the various terminals if that network were to accommodate the traffic that currently moves on the upper reaches of the Mississippi River.
- **Measure** the least-cost method of producing that incremental railroad capacity.

The devil, of course is in the detail.

Measuring Railroad Capacity

Measuring current railroad capacity requires both a set of facilitating assumptions and a tremendous amount of data that describe the terminal facilities and line-haul route segments which, together, make up the nation's rail system. The most fundamental assumption is that the system - at some point in time - was optimally sized so that it precisely met the needs of shippers. For the purpose of our investigation, that period was judged to be 1994.² Accepting this assumption, the process of measuring capacity and determining the various means through which it can be expanded is relatively straight forward.

In order to measure and assess line-haul capacity, data from a variety of Geographic Information Systems (GIS) coverages were combined with data from other sources to build a set of link-specific information describing the physical characteristics of individual network segments. Next, records from the Surface Transportation Board's Carload Waybill Sample (CWS) were routed over the rail network in order to measure the volume of traffic passing over each network link. Finally, statistical models were

² 1994 was the watershed year in which historical rhetoric describing excess railroad capacity gave way to sporadic accounts of capacity constraints. Certainly, in advance of 1994 U.S. railroads were still in the process of "rationalizing" their route systems. Conversely, by 1995 most Class I carriers had expansion efforts at least in the planning stages. If there has been an equilibrium period in the past three decades, it very likely occurred in or around 1994.

developed that relate the observed volume of traffic over a particular route segment to the physical configuration and component quality of that segment. Not only do the models explain the relationship between components, configuration, and segment capacity, they provide a ready vehicle for identifying the various methods through which link capacity can be expanded.

Assessing terminal capacity provides an entirely different set of challenges. No two terminals are the same. Hence, the sort of cross-sectional analysis used to estimate line-haul link capacity is impossible in the case of terminal facilities. Consequently, it is necessary to undertake a painstaking investigation of every terminal at which it can be demonstrated that potential traffic diversions will add appreciable to traffic volumes. These individual analyses must include, but are not limited to: (1) an aggregate assessment of the additional traffic that will pass through the terminal in question; (2) an evaluation of the physical characteristics of the terminal location, including the identification of potential bottlenecks; (3) specific consideration of the individual railroads or combination of railroads that will be required to handle the additional traffic; (4) evaluation of the commodity mix of the additional traffic; and (5) the current potential capacities of both private and publicly owned transload facilities.

Diverting Traffic Onto the Rail Network

Once the rail network is characterized, the next task is to divert traffic from the waterway onto that rail system. Moreover, to ensure the validity of any conclusions it is critical that the diversions be as specific and as accurate as possible. In the case of the upper Mississippi study, this task was made considerably easier by rate and routing information developed as a part of the traditional shippers savings calculations. For each of the 1,331 water movements contained in the shipper savings sample, a rich set of detailed rail, rail/barge, and other land alternatives had already been identified. These alternatives include rate information, so that it is possible to identify the most likely alternative routing based on the economic criteria that would actually guide shipper

decisions. It was ultimately assumed that navigation costs would increase to a level sufficient to drive all traffic from the river, so that the full 135 million tons of currently observed upper Mississippi traffic were placed onto the rail network.³

The Cost of Incremental Rail Capacity

Little is more frustrating for an engineer than to encounter an economist with questions about costs. In order to develop cost information that could be applied to broadly to a "typical" route segment, it was necessary to derive rule-of-thumb cost measures that are not influenced by the case-specific physical attributes that engineers typically employ to produce reliable cost estimates. We continually asked, "How much does it cost to add a mile of Centralized Traffic Control (CTC)," or "What is the cost of an additional 1,000 feet of siding." In response, our inquiries were met with questions regarding grade, soil characteristics, watersheds, and the like.

The final cost estimates used in the upper Mississippi analysis do distinguish between projects undertaken in urban versus rural settings and do discriminate between projects that utilize existing right-of-way and those that necessitate right-of-way acquisition. They even make a modest attempt to account for the regional topology that dictates the cost of establishing acceptable grades. Still, it is necessary to emphasize that these are generic cost estimates that should only be applied in circumstances where aggregation will help to mitigate the rule-of-thumb nature of their development.

Preliminary Results: The Upper Mississippi Basin

The formal document that details the methodology and results of the upper Mississippi basin study is currently in its final development in route to internal review by

³ The all-or-nothing diversions described above were developed specifically for this analysis and may vary substantially from the incremental traffic diversions predicted by the Corps in its traditional NED analysis.

the Corps of Engineers, so that it is not possible to discuss specific results, nor can I guarantee that even the general findings discussed today will survive without modification. Consequently, I would underscore once again that these are *my* preliminary conclusions based on *my* interpretation of the empirical results.

The traffic diversions developed for this analysis hold few surprises. Non-grain commodities were constrained to move over their original origin destination pairs, but these movements were allowed to select between an all land routing and a rail barge combination over the Port of St. Louis where such an alternative was deemed feasible. Export grain traffic was allowed one of four diversions that include: (1) the original origin destination pair over an all land routing; (2) a St. Louis rail/barge alternative to the original export destination; (3) an alternative all land routing to a Texas Gulf port; and (4) an alternative all land movement to the Pacific Northwest (PNW).

Of the non-grain traffic roughly one-half diverted to a an all land routing, while the remaining fifty percent diverted to a rail/barge alternative utilizing transload facilities in the St. Louis area.⁴ A significant portion of export grain traffic from northwest Iowa, Northeast Nebraska and from Minnesota diverted to destinations in the PNW, while traffic from southern Nebraska, Kansas, and western Missouri diverted for export over the Texas Gulf. The remainder of the export grain traffic from eastern Iowa, eastern Missouri, and Illinois either diverted to an all land alternative to the original Gulf location or to the St. Louis rail/barge transload alternative.

The majority of affected export grain shipments originate at or near the Mississippi or Illinois Waterway. Moreover, the predicted diversion of all such traffic generally involves a railroad movement to St. Louis (if not beyond). Consequently, it is the line haul trackage between the grain gathering regions in eastern Iowa, northern Missouri, and central Illinois, along with the terminal facilities at St. Louis which pose the greatest capacity concerns

In order to assess the impact of the additional traffic on line-haul trackage a sample of 15 route segments representing 774 miles of trackage owned by the Burlington

⁴ This includes facilities in Missouri at St. Louis, Jefferson Barracks, and St. Charles, as well as locations in Illinois at Cahokia, East St. Louis, Wood River, Hartford, Granite City, and Alton.

Northern-Santa Fe, Norfolk Southern, Union Pacific (including former CNW), and Canadian Pacific rail systems were analyzed. In all but two cases it was found that track capacity could be nearly doubled through signal improvements, siding extensions, or track component upgrades that would increase train speeds. Thus, it appears possible that each of the half-dozen or so routes between the affected grain loading areas and St. Louis could accommodate as much as an additional 10 million tons of revenue traffic each year without requiring the sort of track modifications that that would appreciably increase the cost of providing rail service.

Diverted traffic would impose additional demands on rail terminal facilities at Omaha, Council Bluffs, Lincoln, Kansas City, North Platte, Houston, and a variety of other locations. However, relative to the traffic that already moves over these points, the additional demands would be quite modest. Our analysis suggests that it is only the capacity of the terminal facilities in the St. Louis area that is of any real concern. The amount of additional rail traffic for the St. Louis area could be significant, amounting, perhaps, to an additional 50 or more unit trains per day. We have developed no information that suggests that Class I carriers would have little difficulty accommodating the additional traffic. However, experts familiar with the area have expressed concern regarding the ability of the two belt or transfer railroads to handle additional interchange or terminating traffic and there is specific concern regarding the capacity of the two railroad bridges spanning the Mississippi which handle the traffic that would necessarily pass between Illinois and Missouri.

Also, the significant amount of grain traffic that is estimated to divert to a rail/barge movement with a transload at St. Louis has raised questions regarding the capacity of the grain handling facilities there. Currently, these facilities handle an amount of grain that is roughly double the volume expected to divert to the rail barge alternative, so that, all else equal, the projected diversions would imply a 50% increase in the magnitude of grain handling activities in the area. Without some alteration of the status quo, this could, in turn, mean a need for expanded grain handling capacity and the additional expense that would imply. It is our judgment, however, that the additional grain rail traffic destined for transload at St. Louis would, in fact, drive shipments that are currently

trucked into the area to transload locations further to the south.⁵ Thus, it appears likely that the additional rail traffic would simply replace extant truck traffic without appreciably increasing the total tonnage loaded to barge.

In summary, any policy alternative that significantly increases the costs of navigation on the upper reaches of the Mississippi River would simultaneously force an accelerated expansion of railroad capacity in the region directly above and including St. Louis. It is our judgment, however, that this capacity could be added through modifications to existing infrastructure that would not, by themselves, necessitate an increase in railroad rates. Thus, the Corps' traditional assumption, whereby, railroad capacity costs are assumed to be constant is valid in this instance.

Concluding Remarks

Rail industry advocates who blithely suggest that that Class I carriers currently possess all the capacity they need to accommodate any foreseeable volume of traffic are discredited by the variety of currently observable railroad efforts to expand system capacity both through line-haul trackage modifications and through the reconfiguration, expansion, or simple avoidance of terminal facilities.⁶ There is very little question that, if current trends persist and projections are realized, ever greater expansions in rail capacity will be necessary. The more pertinent questions are whether there will be sufficient competition to produce the market signals needed to bring about the optimal levels of new rail capacity and whether the incremental cost of that new capacity will increase or decrease the cost of providing railroad services.

The research I've described today was designed to provide some evidence regarding the latter of these two questions - at least with respect to the upper Mississippi

⁵ There is already evidence that Paducah is emerging as an alternative transload location for truck shipments bound for barge.

⁶ Consider for example, Burlington Northern - Santa Fe's resurrection of the route across the Stampede Pass, UP triple tracking in the Powder River Basin, CSX plans to route traffic around Queensgate Yard in Cincinnati, or the myriad smaller projects evident throughout the United States.

River basin. Our goal was ambitious, our methods were novel, and our results are, by all means, tentative. Still, it appears, at least in this isolated setting, that those railroads that would be expected to accommodate traffic diverted away from the upper Mississippi River could do so through capacity-enhancing measures that would not add appreciably to railroad costs.

No one, however, should confuse this conclusion with an endorsement of any policy that would lead to such diversions. Quite to the contrary, it is my personal opinion and professional judgment that commercial inland navigation provides (and should continue to provide) a number of critical economic benefits. First, there are myriad movements of innumerable commodities for which barge transportation provides the least costly transport alternative. This is true even when the full range of both private and public costs are taken into account. Thus, the economic savings that result from the utilization of barge transport represent a net welfare gain that would be lost to Americans if commercial navigation is left unsupported. Moreover, there is mounting evidence that the pollution abatement associated with barge transport may play a critical role in our ability to efficiently provide transportation and simultaneously attain ever more stringent air quality standards.⁷ Finally, barge transport provides an important source of competition to rail carriers in a variety of transportation markets. Again, the ultimate desirability of market driven outcomes depends on the presence of effective competition. Without the disciplining presence of a waterborne alternative, we must seriously question whether unregulated competition can survive as an adequate alternative to a policy of more direct governmental oversight.

Thank you very much.

⁷ While it has yet to be empirically demonstrated, we believe the pollution abatement advantages offered by commercial navigation will persist even in the wake of the recently announced emission standards for railroad locomotives.

MEETING THE HIGHWAY AND ROAD SYSTEM DEMANDS OF AGRICULTURE

by

Paul C. Kerkhoven
Director, Environmental Affairs
American Highway Users Alliance

The Budget proposal President Clinton sent to Congress earlier this month will bring federal spending in line with tax receipts for the first time in 30 years. A task that seemed impossible less than a year ago -- balancing the budget in 1999 -- became considerably easier in January when government economic forecasters projected a fiscal year 1999 deficit of just \$2 billion, little more than a rounding error in a \$1.8 trillion federal budget. The new spending and revenue estimates released by the Congressional Budget Office also project a budget surplus of \$14 billion in 2001 and rising steadily thereafter to \$138 billion in 2008. Those estimates assume no change in federal spending and tax policies.

Many Administration officials, including Agriculture Secretary, Dan Glickman, have spoken about the need for investing in our highways.. Yet even with the rosier economic forecasts, the Clinton Administration sets total funding for highways in 1999 at \$23.2 billion, a cut of \$600 million from current levels. The total includes \$21.5 billion for the core highway program, a freeze at FY98's funding levels. In contrast to the funding freeze, highway use taxes deposited in the highway account next year will jump to \$32.2 billion, a \$10.6 billion increase, reflecting Congress' decision to shift all fuel taxes into the Highway Trust Fund (HTF) beginning last October.

The \$9 billion gap between taxes paid by motorists (\$32.2 billion) and funding proposed for highway improvements (\$23.2 billion) serves two major purposes in the Clinton budget. First, the Administration proposes to use some of the highway taxes to subsidize Amtrak out of the Highway HTF for the first time in history. Second, fuel taxes not invested in highways or used to subsidize Amtrak and mass transit would be held in Washington, to help make the budget deficit appear balanced in FY 1999. By withholding highway taxes to offset the federal deficit, the Administration's budget would triple the cash balance in the HTF in just five years, allowing it grow to \$77 billion by 2003.

The bottom line is that highway users would continue to pay billions more each year in the HTF than they get back in road and bridge investments. Their tax dollars would instead be diverted to fund non-highway programs such as Amtrak, and to mask the true size of the federal deficit.

Importantly, the outlook for highway users is better on Capitol Hill. Fifty four U.S. senators now have cosponsored an amendment to the Senate Highway bill that would increase highway funding to approximately \$30 billion per year, beginning in FY 1999. In addition, the highway bill already approved by the House Transportation and Infrastructure Committee would raise highway funding to \$32 billion per year beginning in FY 2000.

Begin action immediately on the highway reauthorization bill

Will highway user fees be invested in road and bridge improvements or held in Washington to make the federal budget look balanced? That's the underlying question at issue now as leaders of the United States Senate decide whether to begin action immediately on the highway reauthorization bill or to postpone consideration of the bill until Congress finishes its work on the FY 1999 budget later this spring or summer.

Before Congress adjourned last November, Senate Majority Leader Senator Trent Lott (R-MS) indicated the highway bill would be the first legislation considered when the Senate returned to Washington in January. (ISTEA actually expired last September, and the highway program is operating on a temporary extension.) However, there is now talk of postponing the debate on the highway bill until Congress finishes the 1999 federal budget. This would mean a delay at least until April 20, when Congress returns from a two-week Spring recess. That leaves just two weeks before the May 1 funding deadline, virtually guaranteeing that federal highway funds will be cut off. After May 1, states are prohibited from spending any federal highway funds. Unlike previous delays, this stoppage will occur in the middle of the construction season putting real people, with real jobs, out of work.

Opponents of increased highway funding are pressuring Senator Lott to postpone the highway bill until Congress completes action on the overall federal budget. If that happens, highway funding opponents may convince other senators to use billions of dollars in highway user fees to help cover the overall federal deficit rather than using highway taxes for their intended purpose: financing road and bridge improvements.

The cost to the American farmer will increase

The longer transportation investments are delayed today the more it will cost the American farmer and U.S. economy tomorrow. The efficient and timely movement of farm commodities and the products of the food industry are absolutely critical to the productivity and competitiveness of America's agriculture. Annually throughout the U.S., \$190 billion of farm produced commodities are transported by highway and roughly \$60 billion of farm and food exports are moved to ports and borders by highway, rail and ship. Fifty percent of the agricultural products produced for domestic consumption are transported by truck, while 12% of the products for international markets are transported by truck. American agriculture needs our strong commitment to investment in infrastructure.

The implications to our agricultural community are immense. Every single product sold in the United States moves by truck at some stage of development. Trucks transport almost all fresh and frozen foods and other high value agricultural products. Over 50% of our domestic grain is transported by truck. It is estimated that we have a 16-day supply of food in the United States, one can literally say that without trucks and high quality highways we would all go hungry.

The safety of rural motorists is also at risk

The safety of America's rural motorists is also at risk from under-investment in roads. A FHWA study finds that road design and surface conditions contribute to almost 30% of fatal crashes. This amounts to over 12,000 deaths per year attributable in part to roads that are 1) poorly designed,

2) carrying more traffic than they were built for, or 3) inadequately maintained. We cannot afford to delay lifesaving highway projects. Seventy-six percent of all fatal crashes in 1995 occurred on two-lane roads and 63% of the deaths in roadside hazards occurred on rural roads where there are few safety features such as guardrails, median barriers or shoulders.

International trade

While maintaining existing highways must be America's top priority, some new highways are needed to meet growing travel demand and to serve emerging markets and trade corridors and interior ports. Trade with Canada and Mexico is increasing rapidly under the North American Free Trade Agreement (NAFTA). Some Canadian and Mexican border states have witnessed substantial increases (for example truck freight movement has increased 24 percent from 1994-1996) in international commercial freight traffic exceeding the design capacity of state highway routes that serve as primary trade routes. Increased trade traffic also has placed heavy burdens on trade corridors connecting border locations and other ports of entry with major trade centers in the interior United States. But while NAFTA puts pressure on north-south routes the current Interstate System was primarily designed for east-west trade routes. America remains the world's premier economic power. But our competitors have discovered the economic value of high quality highways and are building aggressively. In order for our nation to promote the efficient movement of goods and services we must continue to build new highways to meet economic and demographic circumstances.

State transportation department activities

The Road Information Program (TRIP) recently surveyed state transportation departments to ascertain what will happen after May 1 if a new highway bill has not been signed into law by that time. Even with preliminary results, it is clear that billions of dollars worth of projects will be postponed until new federal funding is available. These are critical transportation projects — projects designed to improve road safety and reduce the number and severity of highway crashes, to smooth the flow of traffic so we can improve air quality, and to reduce congestion so

Americans can spend more time with their families and less time trapped in gridlock.

The following is a partial list of some of the most critical transportation projects that would have to be postponed during the 12-month period beginning May 1, 1998 if no new federal funding is available:

- in **Georgia**, the state transportation department will have to delay improvements to I-475 from I-75 in Bibb County to I-75 in Monroe County; improvements to the Harry S. Truman Parkway in Chatham County; work on the Jefferson Bypass in Jefferson County; and improvements to Peachtree Industrial Boulevard in Gwinnett County.
- the **Indiana** transportation department will have to postpone rehabilitating I-69 in Dekalb County; road and bridge rehabilitation on I-465 in Marion County; and bridge rehabilitation on US 20 in St. Joseph County.
- in **Kentucky**, funding will dry up after May 1 for projects to widen US 27 to four lanes from Lexington to Paris; to reconstruct the Donaldson Road interchange on I-75 in Boone County; and to replace the Cumberland River Bridge in Somerset.
- in **Maine**, delays will occur on the rehabilitation of the Carlton Bridge on US Route 1 in Bath; the reconstruction of four miles of Route 9 in Devereaux; and the replacement of the Penobscot River Bridge on Route 11 in Medway.
- the **Missouri** transportation department will have to postpone the replacement or rehabilitation of seven bridges on I-70 in the St. Louis area; plans to add left turn lanes on Route 61 at Lemay Woods in St. Louis to improve traffic safety; the widening and resurfacing of Route 39 in Barry County; and the replacement of two bridges over the North Fabius River on Route 136 in Scotland County.
- in **Nevada**, they'll have to delay plans to widen I-15 from two to three lanes in West Las Vegas; to remove and replace pavement on I-80 in Reno, and to widen US 95 to four lanes in Las Vegas.
- in **New Hampshire**, our failure to enact a highway bill by May 1 will mean the transportation department has to postpone reconstructing exit 20 on I-93 in Tilton; the safety improvements planned for I-93 in Manchester; and replacing a bridge over North Branch River in Stoddard.
- in **North Dakota**, congressional inaction will mean postponing plans to reconstruct South Washington Street in Grand Forks; to improve I-94 from Eagles Nest to Geck; and to widen US 52 from Drake to Harvey.
- the **Oklahoma** transportation department will have to shelve plans for interchange

reconstruction and resurfacing on I-35 in Oklahoma City (a project designed to relieve congestion); a project to widen 50 miles of US 183 from Cordell to Snyder in western Oklahoma to provide four lane access to I-40 (designed to foster economic development in the region); and plans to build shoulders and a passing lane on US 283 in Beckham County to improve highway safety.

- in **South Dakota**, failure to meet the May 1 funding deadline will mean delaying plans to reconstruct I-29 in Minnehaha and Moody County; plans to improve Benson Road in Sioux Falls to provide access to the Joe Ross Field Airport; and a project to improve the interchange at the Haines Avenue exit on I-90 in Rapid City.
- the **Texas DOT** reports that the following projects scheduled for Spring 1999 — all designed to relieve congestion — would be delayed without new federal funding beyond May 1: widening to eight lanes a 4.3 mile section of Route 1960 in Harris County; widening to eight lanes a 3.9 mile section in Fort Bend County; and widening to four lanes a 6 mile section of US 67 in Johnson County.
- in **Utah**, the following projects — all related to preparations for the 2002 Winter Olympic Games — would be delayed: the reconstruction of the Kimball and Silver Creek Junctions on I-80; the construction of the 1.5 mile Winter Sports Road; and the reconstruction of the interchange at I-84 and US 89.
- in **Vermont**, our inaction will mean delay in the planned resurfacing of 200 miles of state highways; the rehabilitation or replacement of three state highway system bridges and five local highway system bridges; as well as the reconstruction of four miles of US 7 in Shelburne, South Burlington to increase capacity and improve traffic flow.
- in **West Virginia**, the lack of new federal highway funds after May 1 would mean postponing the renovation of the Sheperdstown Bridge on WV 480 in Jefferson County, the widening of a segment of WV 2 in Ohio County to improve traffic flow; and the replacement of the Easley Bridge in Princeton, Mercer County.
- in **Wyoming**, the Senate's failure to act by May 1 would mean delaying reconstruction and bridge work on I-80 in Rock Springs, Rawlins, and Laramie Marginalal; as well as widening and rehabilitation projects on I-90 from Buffalo to Gillette and from Moorcroft to Sundance.

Jobs at stake in delay of highway bill

The approaching May 1 deadline is having a disruptive impact on road construction in some states, and the disruptions will grow exponentially if the deadline comes and is surpassed without enactment of a new highway bill. For instance, the state of Missouri has announced it will stop

bid-lettings in April, Illinois and Ohio will follow suit on May 1, and the Tennessee Department of Transportation has told contractors that the state will delay all federally-funded highway projects beginning in March. As states announce delays in project bid-lettings, contractors know they will have more difficulty finding work for their employees and making payments on their machinery and facilities.

If new federal highway funds are not available after May 1, much of the summer construction season will be lost. If there is no new highway bill until September, the entire fall construction season will be lost, and since winter road construction is nearly impossible in many of our northern tier states, construction and related industries in those states may be out of work until spring, 1999. Construction does not operate like an assembly line that can be stopped and started again on short notice. The design and construction of highway projects are carefully planned months in advance. Projects to be constructed in September generally must be planned and funded by May.

And if Congress' inaction on the highway bill cripples the construction industry, what effect will it have on the national economy? The last Census of the Construction Industry tallied 572,851 construction companies with a total employment of 4.6 million persons. The industry's annual estimated payroll is \$118 billion, and construction companies work on projects valued at approximately \$528 billion a year in the United States. Clearly, crippling the construction industry will have a dramatic, ripple effect on our overall economy. The U.S. Department of Transportation has estimated that every one billion dollars invested in highway construction creates 42,100 jobs.

Funding for Highways

The practice of collecting federal fuel taxes exclusively from highway users to pay for the construction, maintenance and administration of highways and bridges dates back to 1956 with the establishment of the Highway Trust Fund. President Eisenhower called it the "pay as you go" plan. With three exceptions, a promise to dedicate fuel tax revenues to roads has accompanied every fuel tax increase since 1956. The last exception was President Clinton's 4.3 cents per gallon fuel tax increase in 1993; \$6.5 billion in highway use taxes went to general government programs like the IRS and funding for the arts.

Last October, Congress, in the Taxpayer Relief Act of 1997, took the long overdue step to shift all fuel taxes into the HTF, and highway use taxes deposited in the highway account next year will jump to \$32.2 billion. The highway reauthorization bill approved by the Senate Environment and Public Works Committee authorizes the use of the federal gas taxes already deposited in the HTF, but does not make use of the Highway Account's share of the 4.3¢ gas tax revenues transferred to the HTF in the Taxpayer Relief Act, in effect allowing for the continued diversion of gas tax revenues for non-transportation spending.

Fifty four U.S. senators now have cosponsored an amendment offered by Senators Byrd, Gramm, Warner and Baucus that would authorize the use of the additional \$6 billion per year, the amount raised by the Highway Account's share of the 4.3¢ gas tax for highway infrastructure. Over the life of the bill, an additional \$30.9 billion would be available for highways if the Byrd, Gramm, Warner, Baucus amendment is adopted. Under the amendment, every state would receive the same percentage of apportioned funds as they receive in the Committee bill, although the total amount of funding would be about 25% higher.

Every President since Lyndon Johnson has withheld highway taxes to offset the federal deficit. Since the HTF became a part of the "unified budget" its cash balance (surplus) has risen 20 fold, from \$1 billion in 1968 to a whopping \$23 billion in 1997. The bill approved by the Senate Environment and Public Works Committee would continue that practice and increase the cash balance in the HTF to over \$60 billion by 2003. The Byrd, Gramm, Warner, Baucus amendment would bring us closer to spending the highway taxes deposited each year in the HTF.

Defining the needs of our nations' infrastructure

Our nations' highways and bridges need every penny collected from our motorists. After years of under investment, America's roads and bridges are in critical need of modernization and repair. Funds available for highways have not kept pace with the meteoric growth in vehicle travel. In its November 1995 "Conditions and Performance Report", the FHWA found that 28% of our nations' 3.9 million miles of streets, roads and freeways are in poor or mediocre condition and 32% of our nations' 575,000 bridges are deficient. The report concluded that the United States must invest an additional \$20 billion each year just to maintain the current condition of our roads and bridges and additional \$40 billion annually to improve them.

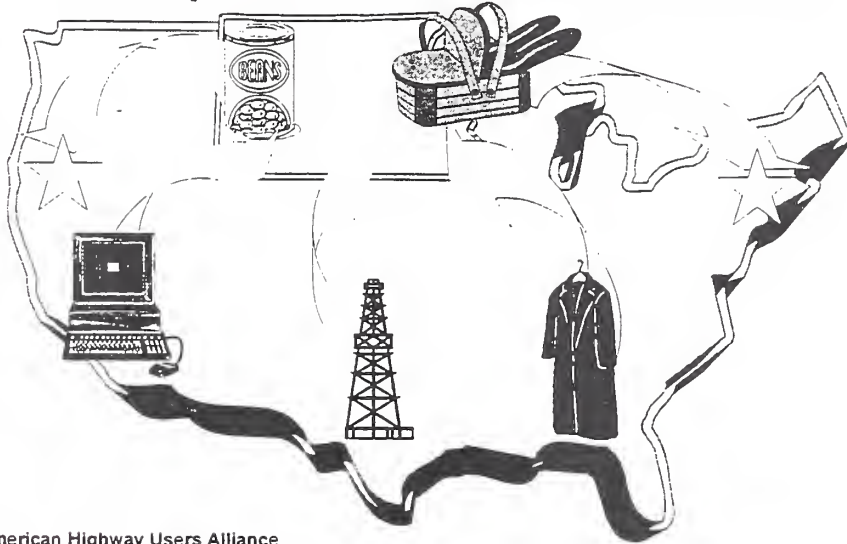
Summary

America owes a large measure of its great economic success to a good transportation system. Rail in the first part of the century and highways in the past half century have positioned our nation to assume and maintain global preeminence. On the brink of the 21st century, however, the nation's roadway system is taken for granted and the federal policies governing how it is financed have taken a wrong turn. The system's physical condition is eroding while resources for repairs and improvements are spent for nonhighway purposes or idled in unproductive accounts. The result is a rising number of highway fatalities, productivity-robbing congestion, and a deteriorating highway infrastructure that imperils our economic health and hinders our ability to compete in the global market place. For the agricultural community this is especially important because the efficient and timely movement of farm commodities and the products of the food industry are absolutely critical to the productivity and competitiveness of America's agriculture

I urge all of you to look to the future and tell your Senators to get on with the debate on the

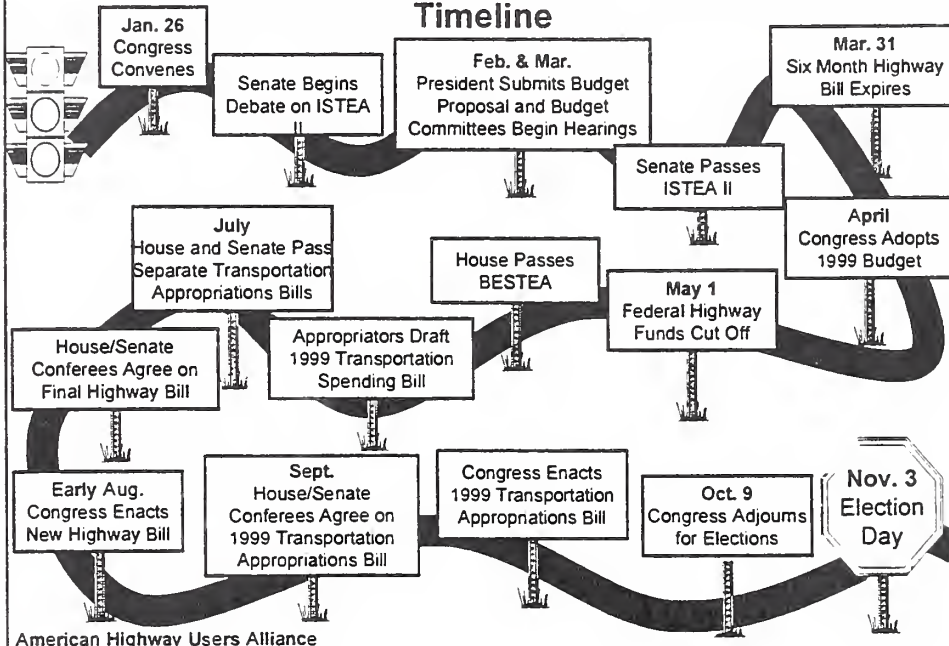
highway bill as soon as possible and ensure that all federal highway taxes are devoted to road and bridge improvements. The May 1 deadline is looming and a lot of work lies ahead before Congress can send a bill to the President's desk for his consideration and signature. Congress needs to know that the American agriculture community wants it to act now on a new highway bill.

From Farm to Market Transportation Serves Rural America



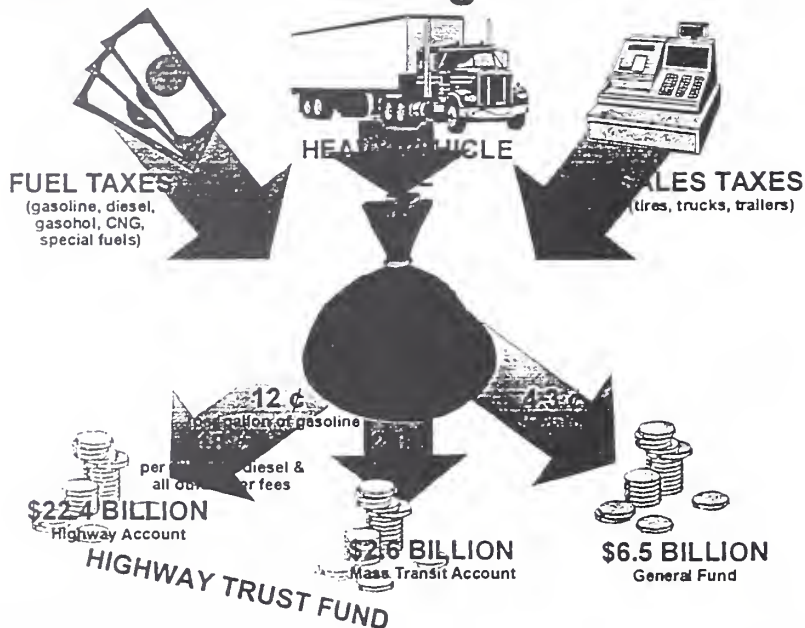
American Highway Users Alliance

Road to Highway Reauthorization: 1998 Legislative Timeline



American Highway Users Alliance

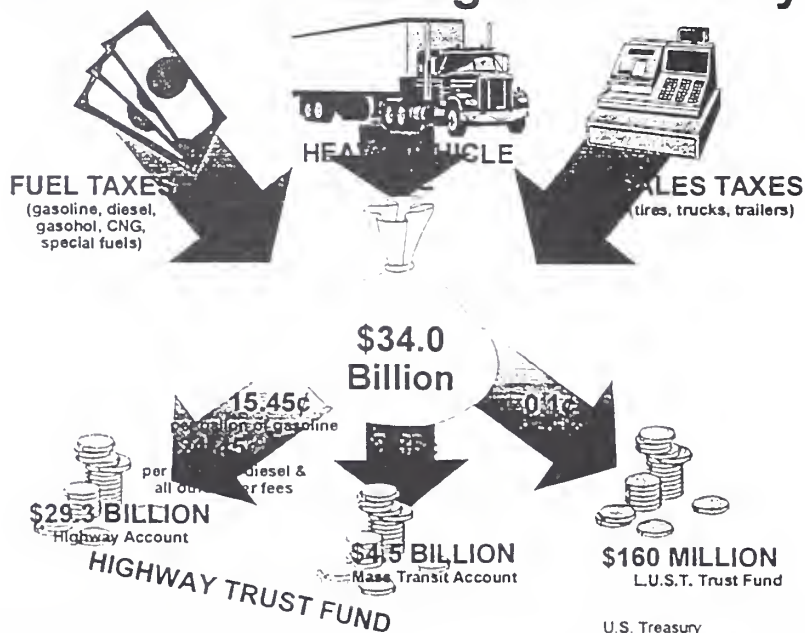
Where the Funding Went -- 1996



American Highway Users Alliance

U.S. Treasury

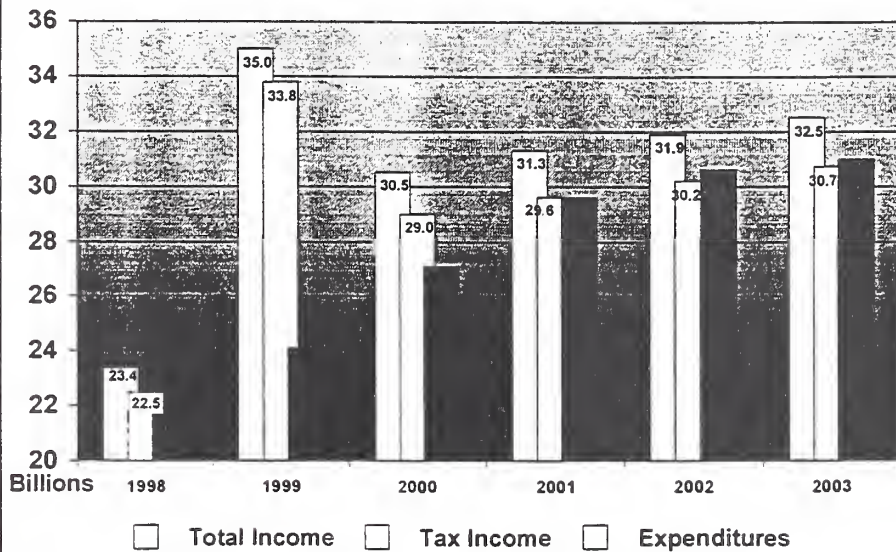
Where the Funding Goes Today



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U.S. Treasury
1998-2003 Average Annual Amounts

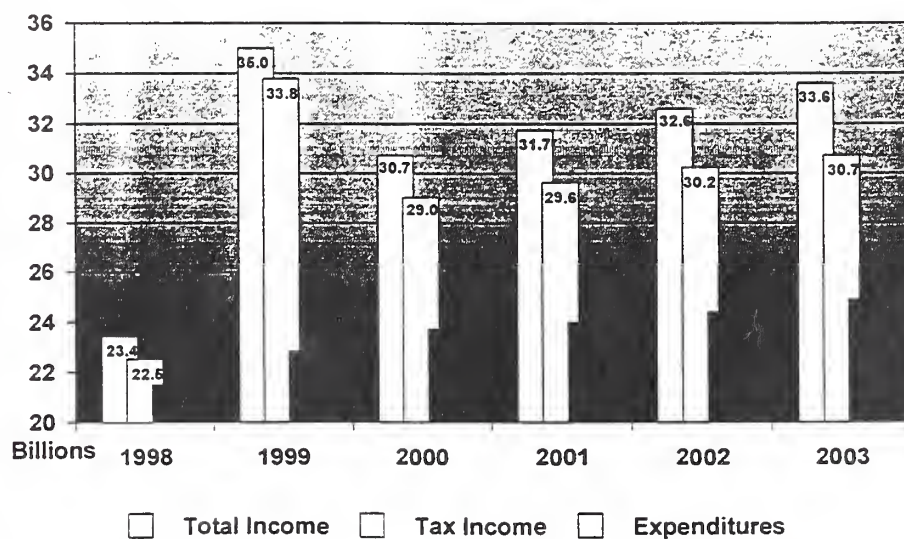
The Highway Account Under BESTEA (H.R. 2400)



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Federal Highway Administration

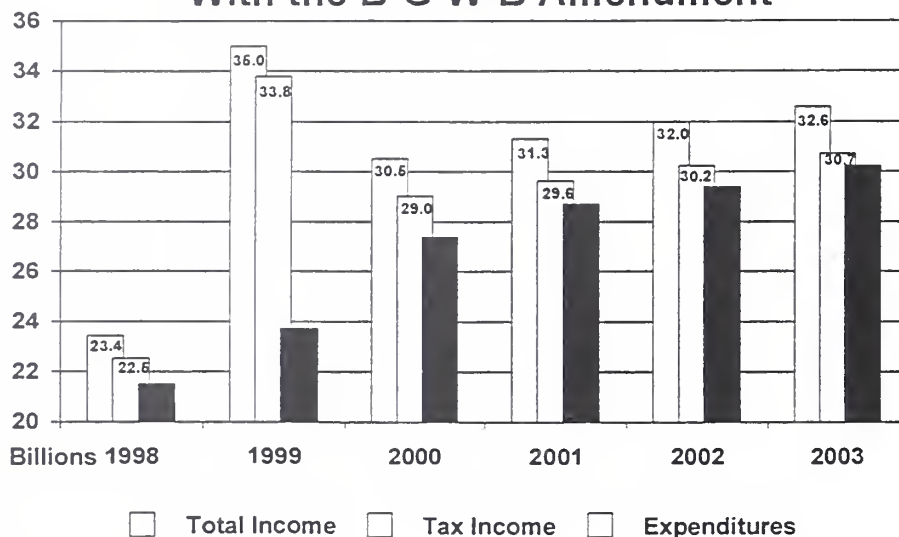
The Highway Account Under ISTEA II (S. 1173)



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Federal Highway Administration

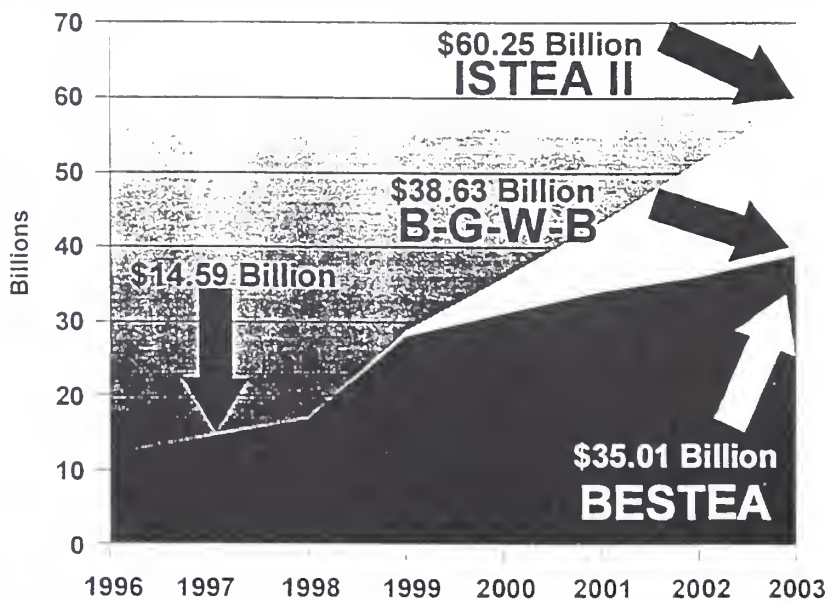
The Highway Account Under ISTEA II With the B-G-W-B Amendment



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Federal Highway Administration

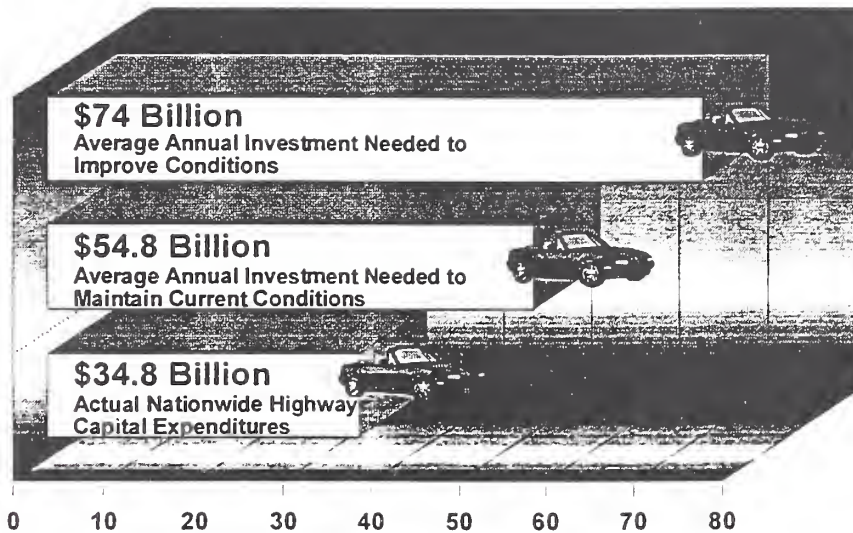
Cash Balance in the Highway Account



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Federal Highway Administration

What's Invested & What's Needed



Combined Federal, State, and Local Expenditures

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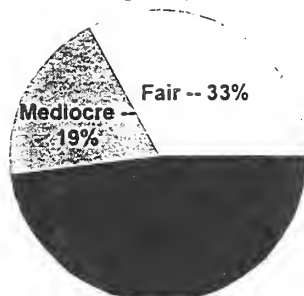
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THE OUTLOOK FOR FOOD PRICES IN 1998

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After increasing 2.6 percent in 1997, the Consumer Price Index (CPI) for food is expected to increase 2 to 3 percent in 1998. If the increase is around 2 percent, it may be the smallest price increase since the early 1990's, when food prices increased 1.2 percent in 1992 and 2.2 percent in 1993.

Although 1998 looks like a good year for lower food prices, there are a couple of factors that may determine if the increase is closer to 2 or 3 percent. The first unknown is whether the sluggish export market for beef, pork, and poultry continues throughout 1998 and the second uncertainty is if the current strong El Nino and unsettled weather patterns continue through spring 1998 in the fresh vegetable growing areas of Florida, California, Arizona, Texas, and Mexico. These two factors could have a major effect on the food at home index in 1998 since the CPI's for beef, pork and poultry account for 20 percent of the food at home CPI, while fruits and vegetables account for an additional 20 percent. Another factor that may skew the individual food category indexes is the re-weighting of all CPI items by the Bureau of Labor Statistics (BLS) this year. After the re-weighting, we are anticipating that the weight for food away from home (currently 36.9 percent) will increase in importance by an additional 1 or 2 percent over food at home (currently 63.1 percent), as a percent of all food.

Retail food price changes are underpinned by general economic factors that influence food prices and the relationship between farm and marketing costs. In recent years, food price increases have been small due to the low general inflation rate, which is forecast to increase 2 to 3 percent in 1998; a larger share of the food dollar going to purchases of food away from home, which has been over 47 percent the past two years; the continued decline in the farm value share of the retail price for most food items, which is expected to average 24 or 25 cents in 1997 and 1998; and increasing economies of size in the farm sector.

Food price changes are also a key variable determining what proportion of income consumers spend for food and what is left for purchases of other goods and services. In 1996, 10.9 percent of household disposable personal income went to pay for food, with 6.7 percent for food at home and 4.2 percent for food away from home. The downward trend in the proportion of household disposable personal income going toward food should continue into 1997 and 1998. Preliminary figures on food sales for 1997, show food at home spending up 2.5 percent and away from home spending up 3.7 percent. After adjusting 1997 food sales for inflation, which provides an indicator of food quantities actually purchased, food at home spending went down 0.1 percent while food away from home spending went up 0.8 percent. With continued competition between grocery stores, restaurants and fast-food establishments, this pattern is expected through 1998.

The food at home CPI increase of 2.5 percent in 1997 was moderated by lower grain prices, large supplies of competing meats, adequate supplies of fresh fruits and vegetables, increased sugar production, and strong competition in the soft drink and prepared food industries. The 1997 CPI increase of 2.8 percent for food away from home, was the largest increase since 1991 and was partly driven by tighter labor markets that have increased general wages. However, competition among restaurants and fast-food establishments remained strong and held down the full pass-through of higher wage and raw materials costs to consumers. An additional pass-through is expected through early 1998.

A discussion of some individual categories of the CPI for food can help explain price changes in 1997 and expected changes in 1998. In summarizing 1997 food price increases, lower grain prices encouraged increases in pork, poultry, milk, and egg production; cereal and bakery product price increases were also smaller because of lower grain prices; plentiful supplies of fruits and vegetables led to smaller retail price increases; and while coffee prices were up for 6 months in 1997, lower prices for carbonated beverages during the same period mitigated the increase for the nonalcoholic beverages index.

- **Meats.** U.S. livestock and poultry prices are under pressure from large meat supplies and reduced prospects for exports in 1998. In addition to large U.S. meat supplies, the currency devaluations in other countries and the need to find alternative meat markets due to economic problems in Asia are making the U.S. a more attractive market for foreign exporters and hurting the U.S. in world competition. As a result, net exports of U.S. red meat are expected to shrink in 1998, further adding to abundant meat supplies competing for the U.S. consumer dollar. As a result, the meat, poultry and fish index, which increased 2.9 percent in 1997 is expected to drop up to 2 percent in 1998.
- **Beef and veal.** Commercial beef production in 1998 is expected to fall 1 to 2 percent, from 1997 levels. The Asian financial crisis and the strong U.S. dollar are expected to lead to lower beef exports and rising imports, as the U.S. becomes a lucrative market due to the strength of the dollar. U.S. beef exports are likely to decline almost 7 percent in 1998, as declining sales to the Pacific Rim overwhelm any increased sales to Mexico. After increasing a modest 1.7 percent in 1997, the CPI for beef and veal is expected to increase at about the same rate in 1998, from 0 to 2 percent, as large supplies of competing meats and a less than robust international trade scenario hold down price increases in 1998, until at least late summer.
- **Pork.** With expectations of plentiful supplies of pork and competing meats throughout 1998, pork retail prices are expected to fall 4 to 6 percent, after increasing 5.2 percent in 1997. Forecast of a 9 percent increase in pork production in 1998 should lead to the largest per capita consumption rate since 1994, increasing 5 pounds from 1997 levels to almost 70 pounds per person. U.S. pork exports in 1998 are expected to be 990 million pounds, off 10 percent from previous estimates because of expected reductions in Asian demand. In particular, U.S. exports to Japan are expected to be down in 1998, due to losses in market share to lower priced Korean pork products and a stronger U.S. dollar.

- **Other meats** increased 2.8 percent in 1997, and in 1998 prices are expected to remain flat, from -1 to 1 percent. Other meats are highly processed food items (hot dogs, bologna, sausages) with their price changes influenced by the general inflation rate as well as the cost of the meat inputs.
- **Poultry.** Broiler meat production for 1998 is expected to be almost 29 billion pounds, up 5 to 6 percent from 1997. However, 1998 turkey production is expected to be unchanged from 1997, as weak net returns in 1996 and 1997 put pressure on turkey producers to hold down production levels. During the past several months, export prospects for U.S. poultry have become less certain due to the continuing financial crisis in many Asian countries; depreciated currencies in Thailand and Brazil, which give them a price advantage over the U.S. in many major markets; and the outbreak of Avian influenza in Hong Kong, which was the second largest market for U.S. broilers and turkeys. As these factors continue into 1998, production increases will likely slow down, with the CPI for poultry expected to be between -1 and 1 percent, after increasing 2.8 percent in 1997.
- **Fish and seafood.** The CPI for fish and seafood was up 2.3 percent in 1997, with an expected 1 to 3 percent increase in 1998. Almost 50 percent of the fish and seafood consumed in the U.S. comes from imports, with the remaining amount from U.S. farm raised production. Imports for 1997 were up--salmon, shrimp, crawfish, mussels, tilapia, and oysters. Domestic production of catfish and trout was also up, with the U.S. having one of the world's largest fishing industries with year-round production. In the 1990's, U.S. per capita seafood consumption has remained flat, between 14.8 and 15.2 pounds of edible meat per year, with any increases in total domestic seafood consumption coming from population growth.
- **Eggs.** After volatile egg prices in 1996 and a CPI increase of 18.0 percent, higher production and lower export levels during 1997 led to larger U.S. consumption of eggs and lower average retail prices. With table egg production expected to be about 2 percent higher in 1998, consumption is expected to increase again, to the highest level since 1988. Because of the higher production level in 1997, the CPI for eggs fell 1.5 percent, but is not expected to increase this year, averaging between -1 and 1 percent in 1998.
- **Dairy products.** Milk production in 1997 increased about 1 percent from 1996 levels, because of increased demand and lower feed costs. Increased production led to large U.S. commercial dairy stocks, particularly of nonfat dry milk and American cheese. These factors, along with a modest dairy product demand, led to a 2.4 percent CPI increase in 1997. With milk output expected to increase slightly this year, retail prices for dairy products are forecast to increase from 0 to 2 percent in 1998.
- **Fats and oils** increased 0.9 percent in 1997 and are expected to increase a modest 1 to 3 percent in 1998. Since fats and oils are highly processed food items, their price change is influenced by the general inflation rate in addition to U.S. and world supplies of vegetable oils. Soybean oil is the primary oil used in the production of vegetable oil products, however the relationship between soybeans and the retail price of vegetable oils

is complex. Soybean oil is a joint product with soybean meal, which is primarily used for animal feed.

- **Fresh fruits.** Total fruit-bearing acreage has increased steadily for the past 5 years. Citrus fruit acreage has expanded because of re-plantings in Florida, after a freeze in the late eighties, that have begun to bear fruit. These trees, which include oranges and grapefruit, will be producing increasingly larger crops into the early 2000's. California has also expanded its orange production areas with most of their crop going for fresh use, while the majority of Florida's oranges are used for juice.

Summer fruits were also in abundant supplies in 1997, bringing about generally lower prices and expanded export opportunities for the U.S. fruit industry. California, the largest producer of peaches in the U.S., produced another large crop in 1997. Supplies of nectarines, plums, apricots, and sweet cherries were also abundant in 1997. Apple production was down about 2 percent in 1997, due to a smaller Washington crop and smaller fruit size in North Carolina and Virginia. Banana supplies, which are all imported, were sufficient to meet demand the past two years with retail prices averaging 49 cents per pound in both 1996 and 1997. The fresh fruit index increased a modest 0.8 percent in 1997, and is expected to increase 2 to 4 percent in 1998 due to continued U.S. consumer demand and projected larger exports.

- **Fresh vegetables.** The weather and growing conditions in the major fresh vegetable growing areas were mixed in 1997. A January freeze in Florida did minimum damage to several fresh market vegetables--squash, snap beans, green peppers, eggplant and tomatoes, with the impact on retail prices for these items less than originally expected. Fresh-market vegetables grown in other states and not affected by the freeze were--potatoes, lettuce, onions, celery, broccoli, cauliflower, and cabbage.

Growing conditions normalized during the spring and summer months, but then weather conditions changed again the last quarter of 1997. Torrential rains in Florida, rain and cold in the desert areas of California, Arizona, Texas, and an unusual December freeze in West Mexico led to lower supplies and higher retail prices for tomatoes, bell peppers, lettuce, and broccoli. In addition to the weather-related growing problems, retail prices for some fresh market vegetables and potatoes were higher in Fall 1997 because U.S. growers reduced harvested area from a year ago. On an annual basis, fresh vegetable prices increased 2.9 percent in 1997 and are expected to increase 3 to 5 percent in 1998. The size of the 1998 price increase depends on the continuation of unsettled weather patterns due to a strong El Nino through Spring 1998, changes in planting intentions, and expected higher prices for potatoes (the most heavily weighted item in the vegetable CPI).

- **Processed fruits and vegetables.** Contract acreage for the five leading processing vegetables (tomatoes, sweet corn, snap beans, green peas, and cucumbers) was down 3 percent in 1997, after a 9 percent decline in planted acreage a year earlier. However, processed vegetable prices increased a modest 2.3 percent in 1997 and are expected to

increase 1 to 3 percent in 1998. The ready availability of fruit supplies also kept the CPI increase for processed fruits to 2.5 percent in 1997, with an expected increase of 0 to 2 percent in 1998.

- **Sugar and sweets.** Domestic sugar production was up to 7.2 million tons in 1996/97 and is projected up another 9 percent in 1997/98. Higher sugarbeet prices and lower prices for competing crops led to acreage increases in both years. Along with higher sugar output, lower retail prices for selected sugar-related food items in 1997 increased the sugar and sweets CPI by 2.9 percent. Although U.S. sugar consumption has grown at a rate of about 1.9 percent per year since 1985/86 and sugar use by industrial users has risen, the CPI is projected to increase a moderate 1 to 3 percent in 1998.
- **Cereal and bakery products** account for a large portion of the at home food CPI - almost 15 percent. While higher grain prices contributed to higher retail prices for selected bakery products in 1996, lower grain prices in 1997 held the increase to 2.1 percent. Most of the costs to produce cereal and bread products are for processing and marketing, more than 90 percent in most cases, leaving the farm ingredients a minor cost consideration. Competition for market share among the three leading breakfast cereal manufacturers led to the cereal component of this index falling 9.7 percent from 1995 to 1996, with an additional decrease of 1.4 percent from 1996 to 1997. With demand for cereal and bakery products as well as competition among producers expected to continue, the CPI for cereals and bakery products is expected to rise at a rate of 1 to 3 percent in 1998.
- **Nonalcoholic beverages.** Coffee and carbonated beverages are the two major components, accounting for 32 and 50 percent of the nonalcoholic beverages index. After falling 2.4 percent in 1996, due to lower coffee prices, the index increased 3.7 percent in 1997, due to higher coffee prices. Although coffee prices were up 12.6 percent in 1997, the increase in the nonalcoholic beverages index was mitigated by a drop of 1.4 percent in carbonated beverages. Competition in the soft drink industry by the two major competitors peaked during the summer months and continued through the end of 1997, leading to the reduction in the carbonated beverages index.

Speculation about a smaller 1997/98 coffee crop in Brazil (the largest Arabica coffee producer) and an uncertain labor situation in Colombia were responsible for the sharp increases in green coffee costs on the world market in spring and summer 1997. These price increases combined with low U.S. coffee stocks produced wholesale price fluctuations that led to higher retail prices for 6 months of the year. Fortunately, prices of Robusta coffee beans, the primary ingredient in retail store coffee blends did not increase as sharply as Arabica prices. Since the CPI for coffee reflects only coffee purchased in retail stores, smaller increases in Robusta prices along with the drop in the carbonated beverages index held down what might have been a larger increase in the nonalcoholic beverages price index in 1997. With coffee prices continuing to decline, the CPI for nonalcoholic beverages is expected to increase 1 to 3 percent.

- **Other prepared foods.** Other miscellaneous prepared foods are highly processed and are largely affected by changes in the all-items CPI. These products include frozen dinners, pizzas, and precooked frozen meats. Competition among these products and from the away from home market should continue to dampen retail price increases for items in this category. In 1997, the CPI for this category increased 3.2 percent and is expected to increase 2 to 4 percent in 1998.

**Changes in Food Price Indicators
1996 through 1998**

| Items | Relative importance ^{1/} | 1996 | Final 1997 | Forecast 1998 |
|---------------------------------|--------------------------------------|------|--------------------------|------------------|
| | --Percent-- | | -----Percent Change----- | |
| All Food | 100.0 | 3.3 | 2.6 | 2 to 3 |
| Food Away From Home | 37.3 | 2.5 | 2.8 | 2 to 3 |
| Food at Home | 62.7 | 3.7 | 2.5 | 1 to 3 |
| Meats | 12.2 | 3.5 | 3.0 | -2 to 0 |
| Beef and Veal | 6.2 | -0.3 | 1.7 | 0 to 2 |
| Pork | 3.4 | 9.8 | 5.2 | -6 to -4 |
| Other Meats | 2.5 | 3.6 | 2.8 | -1 to 1 |
| Poultry | 2.7 | 6.2 | 2.8 | -1 to 1 |
| Fish and Seafood | 2.4 | 0.9 | 2.3 | 1 to 3 |
| Eggs | 1.0 | 18.0 | -1.5 | -1 to 1 |
| Dairy Products | 7.4 | 7.0 | 2.4 | 0 to 2 |
| Fats and Oils | 1.6 | 2.4 | 0.9 | 1 to 3 |
| Fruits and Vegetables | 12.7 | 3.5 | 2.0 | 2 to 4 |
| Fresh Fruits and Vegetables | 8.9 | 2.8 | 1.7 | 3 to 5 |
| Fresh Fruits | 4.5 | 7.1 | 0.8 | 2 to 4 |
| Fresh Vegetables | 4.5 | -2.0 | 2.9 | 3 to 5 |
| Processed Fruits and Vegetables | 3.8 | 5.0 | 2.4 | 1 to 3 |
| Processed Fruits | 2.1 | 5.8 | 2.5 | 0 to 2 |
| Processed Vegetables | 1.6 | 4.0 | 2.3 | 1 to 3 |
| Sugar and Sweets | 2.1 | 4.5 | 2.9 | 1 to 3 |
| Cereals and Bakery Products | 9.2 | 3.9 | 2.1 | 1 to 3 |
| Nonalcoholic Beverages | 5.0 | -2.4 | 3.7 | 1 to 3 |
| Other Prepared Foods | 6.5 | 3.4 | 3.2 | 2 to 4 |

^{1/} BLS estimated expenditure shares.

Consumer Interests in Vertical Coordination in the Pork and Broiler Industries

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Introduction

The pork industry is currently undergoing a period of rapid structural changes, commonly referred to as the *industrialization of the pork industry*. Although its roots are embedded in the early 1980's, changes have accelerated in the 1990's. New technology is creating scale economies, geographical shifts in production are occurring, and the larger production and packing operations are turning to multi-year contractual arrangements and, to a lesser extent, vertical integration.

Moves from open market coordination via spot prices to contracting and integration may limit the ability of smaller independent producers to compete. These *non-spot coordinating arrangements* may create barriers to entry by reducing the number of available market outlets. Independent producers may be subject to price discrimination when the terms of contracts are not made publicly available. Market power through price discrimination or barriers to entry may result in misallocated resources.

On the other hand, these arrangements may also serve legitimate economic functions that benefit consumers. Consumer interests in how the food marketing system is organized is examined in this paper by comparing past developments in contracting and integration in the broiler industry with current changes in the pork industry.

Lessons From the Broiler Industry

The broiler industry began in the 1930's. About 65 million pounds of chicken were produced in 1934, about the equivalent of one day's output in 1991 (Hyk). By 1940, U.S. production increased threefold with Delmarva's (Delaware, Maryland, Virginia) share rising from 32 percent in 1934 to 43 percent in 1940. During World War II, demand for poultry products increased. At this time, it became apparent that broilers could provide a profitable business opportunity. After the war, many new production technologies were developed at a rapid pace. Yet, the manner in which the industry was organized at the time was not conducive to the adoption of available

technology. Spot prices in open markets served to coordinate the flow of resources in the broiler marketing system. Broiler growers purchased chicks from hatcheries and feed from feed dealers. When ready for market, the growers would sell the birds through open markets to processors.

Contractual arrangements between feed suppliers and growers became increasingly popular. Initially, under these arrangements feed suppliers would extend credit to growers with limited financial resources for buildings, equipment, and feed. In turn, feed dealers assured themselves of a potentially large market for their feed supplies. As price and production risk became more problematic for growers, in addition to greater needs for financing, *production contracts* evolved to shift more risk and management responsibilities to the feed suppliers. Additional areas of broiler production began in the South, in part, due to the South's declining cotton industry and their willingness to adopt contractual arrangements (Roy). By 1955, most broilers were produced using production contracts.

In the 1950's and 1960's, feed suppliers added hatcheries and processing facilities, and were referred to as *integrators*.¹ Later, processors assumed the role of integrator, as feed companies left the broiler business to focus on their feed business.

Consumers were the prime beneficiaries of these developments in the broiler industry. Technological gains and structural reorganization of the broiler industry facilitated rapid growth in production. Consequently, broiler prices continued to fall. Following World War II, the emergence of mass merchandising through supermarkets, provided an outlet for large broiler supplies. Broilers could be offered as a "price item" to attract customers into the store. Retailers, as well as consumers, found fresh, eviscerated broilers to be convenient because they required less handling by the butchers. Unlike red meat cuts, there was less concern about how fast various cuts sold because the bird was sold as whole or packaged parts.

As broiler production continued to increase, further reductions in price, and improved responsiveness to consumer preferences contributed to further increases in per capita consumption of broilers. The value of consumers' time increased, household size became smaller, and information linking diet and health became more prevalent. Consequently, consumer preferences for convenient, nutritious food products with assurances of quality became more important (Kinsey). Broiler integrators looked to further processed products, fast food

¹Substantial production growth and price instability contributed to numerous mergers and exits from the industry. In addition, the Poultry Inspections Act of 1957, required mandatory processing plant inspections, which led many processors to update their facilities and add capacity in a short time span. To capture scale economies, the plants had to run. Processors could assure themselves of an adequate supply of broilers through mergers or contracting. This contributed to the demise of the open market for broilers, and further reductions in the number of independent producers and processors (Tobin and Arthur).

outlets, and branding as ways to market their products, in response to the broiler glut. As a result, the percentage of broilers sold as whole declined. Broilers have increasingly been sold as cut-up parts and further processed into products such as nuggets and patties. Because integrators have greater control over the production process, standardization of production inputs enable them to establish brand names. Because a company is associated with the branded product, its reputation hinges on the quality and uniformity of the product.

The domestic market is not the only market that has benefitted from efficiency gains in the U.S. broiler industry. Much of the recent increase in exports were accounted for by Russia and China, which have moved toward more liberalized markets.

Industrialization of the Pork Industry

Although more subtle, there are similar developments occurring in the pork industry. Health enhancing, cost reducing technologies have created scale economies for large production operations. At the same time, hog production is reorganizing to facilitate more rapid growth in size. Whereas production historically occurred at a single site, production has shifted to more specialized operations, where farrowing, nursing, and finishing are conducted at three separate sites. Production contracts between large producers, commonly referred to as contractors or integrators, and smaller growers shift price and output risk from the growers to the integrators. Because growers invest in buildings and equipment, the integrators can invest in other areas of production to rapidly expand their operations. At the same time, packing plant capacity is on the rise. *Marketing contracts* are increasingly used by the large producer-integrators to sell hogs to the large packers. Survey results suggest that these arrangements are used to obtain a consistent, large supply of high quality hogs, and assure a market outlet for large hog supplies (USDA).

Hog production and slaughter capacity has been shifting from the Midwest to the Southeast, led by North Carolina, and other areas to a lesser extent. The decline of the tobacco industry, familiarity with poultry contracting, and lower labor and building costs are commonly cited reasons for expansion in the Southeast.

Efficiency gains in the pork industry are indicated by the number of pigs weaned per litter and the quantity of pork obtained from a given inventory of hogs. The number of pigs weaned per litter reached 8.65 in 1997, up 11 percent from 7.77 in 1987. Productivity gains have enabled hog producers to produce the same quantity of pork as in 1980, the peak year for hog production, with a 20 percent smaller breeding inventory (Benjamin). While productivity gains have contributed to increases in production and reductions in the real price of pork over the past ten years, added production has been exported or used to feed a growing U.S. population. While 1998 per capita consumption is expected to increase by 5 pounds, or 8 percent from 1997, per capita consumption of pork has remained fairly stable over the past ten years.

Future Growth of the Pork Industry

In the broiler industry, while supplies grew rapidly and prices continued to slip, developments further down the chain played an important role in its continual growth. Mass merchandising through supermarkets provided an ideal outlet for large broiler supplies. Later, the industry targeted consumer preferences for quality assurance and convenience through branding and further processing. Hence, price reductions and response to consumer preferences led to further increases in per capita consumption. Moves to contracting and integration appeared to serve an important economic function that facilitated the adoption of technology. Ultimately, these new methods of coordination provided a means to gain control of the production process to enable branding and new product development. Evidence exists suggesting that, since the 1980's, consumer demand for chicken may have increased. Although the exact cause is difficult to pinpoint, it is likely a combination of changing consumer tastes and preferences (for example, health interests and dietary fat concerns), changing relative prices of substitute meats, and higher incomes as premium parts and more value-added products were purchased (Rogers).

Despite growth in pork supplies and reductions in the real price of pork, per capita pork consumption has remained stable over the last ten years. Hence, future growth of the pork industry may hinge on its ability to respond to consumer preferences for quality, quality assurances, and new product development. A 1992 survey of major packing plants suggested that there is considerable room for improvements in pork quality (National Pork Producers Council). It was estimated that quality problems cost packers \$10.08 per hog. Of this amount, \$8.15 was found to be controlled by hog producers. This suggests that increased coordination between producers and packers to improve quality could result in cost savings. In a competitive marketing system, such quality improvements would benefit consumers through lower retail prices and higher quality products (Martinez, Smith, and Zering).

Apparently, packers are turning to multi-year marketing contracts to obtain the quality, consistency, and quantity of hogs for slaughter, as it becomes more costly to obtain hogs on the open market. We may see even more rapid moves to contracting, and perhaps vertical integration, as firms attempt to gain greater control over pork quality. By specifying premiums for higher quality hogs, multi-year contracts may serve to increase the quality of hogs obtained.²

There are, however, important differences between moves to contracting and integration in the broiler industry and current developments in the pork industry. The broiler industry represented a new industry with limited institutional constraints. Growth of the industry was facilitated by the use of contracts and integrated operations. The pork industry is an established industry, still coordinated by spot prices in open markets, for the most part. Hence, moves to contracting and

²USDA found that half of all multi-year marketing contracts included quality specifications.

integration are substituting for an established open market, coordinated by spot prices. Contracting and integration, coupled with larger operations, bring concerns related to market competitiveness.

There appears to be growing institutional constraints that may affect future structural change in the pork industry. Consumers are becoming increasingly concerned about the effect that their own consumption choices and those of others have on the environment (Kinsey). As evidenced by the recent moratorium placed on pork production operations in North Carolina, environmental concerns may limit future growth. In fact, the poultry industry has also been recognized recently for possible water pollution problems. While technology may be able to lessen environmental risks, it is unclear whether such technology might accelerate consolidation of hog production.

The challenge for policymakers is to better understand the short and long run benefits and costs of contracting and vertical integration in more concentrated markets. In addition, by better understanding the reasons for contracting and integration, public policy decisions affecting the viability of open markets can be better formulated.

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SUPERMARKET TRENDS AND CHANGES IN RETAIL FOOD DELIVERY

By

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The supermarket, one of several types of retail food stores, is the last stop for a farm commodity before a consumer selects it. That commodity has been transformed into a (nearly) ready-to-eat food or beverage and shipped through a complex distribution system in response to an order from the manager of a retail food establishment. This manager is the first to observe what consumers are willing to pay and what they desire to eat. The role of the retail outlet in the food distribution chain has evolved from a relatively passive handler of national brands and seasonal products to an active advocate for consumers' preferences. Today the food retail outlet can be thought of as the command center of the food system. Here, data is gathered about what sells. This data is released into the food distribution chain where it signals an order for more (or less) of particular products needed to replenish shelves. These signals are, in turn, relayed up stream through processors to farmers where they make adjustments in crops, livestock, seed types, veterinary services and financing in order to respond to the demand for particular varieties, quantities and qualities of food.

Many factors have induced a shift from "production push" to "retail pull" in the food system not the least of which is an increase in consumers' preference for a wide variety of safe and convenient food. This paper discusses the size, operation and role of retail grocery stores in the food system. The implications for agriculture are many. They include the increased use of vertical coordination and contract relationships up and down the food distribution chain.

The Food and Agricultural Industry - Size and Trends

Food and agriculture is one of the largest industries in the U.S. economy making up 13.4 percent of the Gross Domestic Product (GDP). Retail food sales make up 7.2 percent of GDP, more than any other retail sector including automobiles. This sector employs over 15 percent of all workers with over 12 percent working at the retail end. Grocery stores capture about 53 percent of the food dollars spent while providing over 70 percent of the food (by weight) eaten in the United States.

There are 127,000 grocery stores in the United States; 10 percent fewer than 5 years ago. The top 100 retail food companies (measured by total sales) own or service almost 17 percent of all

these stores compared to 12 percent five years ago (Chain Store Guide). One-third of the \$425.7 billion sales made in grocery stores in 1997 were made in stores affiliated with the top ten supermarket chains (Chain Store Guide, FMI, 1997a). The top four chains, Kroger, Safeway, Albertson's, and American Stores captured 17 percent of total grocery sales. These four chains have been among the top 5 grocery companies since 1976.

Continuous mergers (averaging 54 per year over the last ten years) and on going divestitures (averaging 35 per year) keep this end of the food distribution chain competitive and dynamic (USDA). Economies of size, distribution and management fosters continuing consolidation on a regional basis, but food, like politics, is a local business. Real competition is considered to be within three miles of one's store. Looking at market share in the 100 largest metropolitan areas in the U.S. reveals that in 18 metro areas one chain has captured more than 40 percent of the market share but in none of the areas covered were there fewer than nine chains to choose from (Chain Store Guide).

The percent of total market shared by the four largest chains is a standard measure of concentration in an industry. Among these 100 metropolitan areas 24 had concentration ratios of over 80 percent including 4 areas that were over 90 percent. Almost half had concentration ratios between 66 and 80 percent (Chain Store Guide). Economists have worried about whether concentration would lead to higher food prices; evidence on this is very mixed (Cotterill).

We can expect continued buyouts and mergers and reorganizations. Supermarkets are getting bigger, with median store size now over 38,000 square feet. Club stores and supercenters have between 100,000 and 200,000 square feet with at least 40 percent of it devoted to groceries. Sales per square foot is a standard performance measure and it has increased, on average, from \$392 to \$409 over the past 5 years. As stores get larger and add more high service departments, this figure fluctuates across chains. The range of sales per square foot was between \$1,026 and \$180 in 1996 with the higher figures tending to be aligned with stores that sell higher priced products (Chain Store Guide).

The formats of grocery stores has changed dramatically. A supermarket is generically defined as a full line grocery store with sales of over \$2.5 million per year. A conventional supermarket is defined as a store that devotes most of its space to a full line of food and beverage products including fresh meats and produce. This type of store format is declining in numbers. The large growth has been in supercenters, superstores and combination stores where up to 60 percent of floor space may be devoted to nonfood merchandise. Convenience stores are also a fast growing format.

The definition of store formats varies by author. One distribution of the number of stores by format shows that convenience stores comprise 44 percent of all the store units, combination stores 33 percent, superstores/warehouses have 9 percent and conventional supermarkets, 14 percent. By sales, however, these supermarkets have 33 percent of the market,

superstores/warehouses have 42 percent and convenience stores only 6 percent.

The physical layout of stores is changing as is the mix of products sold. This is in response to two large competitive threats: 1.) Wal Mart and 2.) Consumers' shift to fast food and take out food from other establishments. The response to Wal Mart is in the form of distributional reengineering and will be discussed later. The response to consumers continued desire for meals-to-eat verses food-to-cook has lead this industry into a flurry of activity to find the best way to sell food ready-to-eat. It is called "meal solutions" or "home meal replacement" and it dominates most of the business decisions in retail food stores today. Store layouts are changing to accommodate the shopper who wants to pick up a quick meal to eat on or off premise. The traditional store where you are forced to walk through aisles of dry groceries to find the dairy and produce is evolving into a store where dry grocery is moved to the back left hand corner and fresh produce and deli food is up front, often with its own fast checkout stands. This is a deliberate attempt to capture a larger share of consumers' meal dollar. With over half of food purchased in food service places being taken out to eat, grocery stores need to be in this game. Between 1994 and 1996 the percent of consumers who reported that the grocery store was their primary place to get take out food jumped from 12 to 22 percent but the majority of take-out food sales are still going to restaurants and fast food places.

Supermarket Finances

The most frequently cited fact about supermarkets is that they operate on very small profit margins. In 1996-97 their average net income (total sales minus cost of good sold, taxes, interest and operating expenses) was 1.08 percent of net sales (0.53 percent for stores with less than \$100 million in annual sales and 1.26 percent for stores with sales over \$100 million). In addition, real dollar sales have risen less than 1.6 percent since 1992 and in "same stores", real sales have fallen by up to one-half percent in three of the past five years. It would appear that this competitive business is operating on the edge. It is not, however, unprofitable. Return on equity has been between 13 and 16 percent over the past four years and return on assets was between 3 and 4 percent.(FMI, 1997b).

Store expansions in this industry are notable. Some would say expansion is beyond the demand and population needs. The top 100 grocery chains, who account for two-thirds of all store sales, increased their number of stores by 26 percent to 20,134 stores since 1992 and the total selling space by 33 percent to 667,422 square feet. Sales per square foot increased only 4.1 percent over this period reflecting the maturity of this business. (Chain Store Guide) .

Food Delivery - Logistics

In 1992 the grocery store industry began to realize the impact of a major competitor - Wal Mart. At the time Wal Mart had only 50 stores that sold a full line of groceries, but they had arrived on the scene with the most sophisticated and integrated logistics system known to

retailing. They had contracts with their suppliers for specific products at every day low prices. These products were to be delivered to distribution centers at specific times and to be dispensed to stores without delay. The lean inventory, warehouse and trucking system allowed Wal Mart to cut their operating costs 5 percentage points below the average in the grocery business, and they were planning to open more superstores with groceries in the future. By now they have over 370 food stores in the United States. Food sales of \$18 million represents a five year growth of 685 percent. They now rank 10th in food sales in the country. They have changed the landscape for retail stores of all types.

Large supermarket chains and their suppliers sat up and took note. Through their trade associations they began an initiative in 1992 called "Efficient Consumer Response" (ECR). The ECR national committee was formed. It is made up of representatives of food companies at all levels, equipment suppliers, and many others who were interested in designing a food delivery system that would be more efficient. At its heart is electronic data interchange (EDI) where retailers would transmit real time sales data directly to manufacturers (or wholesalers and brokers who pass it on to manufacturers). This would provide a continuous flow of information about how fast each product was selling and the rate at which it should be replenished by the distributor and how fast manufacturing lines should be adjusted to speed up or slow down the production of fast (slow) moving items.

Many changes in management activities will accompany the full implementation of ECR. They include category management (identifying and eliminated slow moving items), activity based costing (ABC, assigning management and overhead costs to the departments or categories that use them), customer loyalty programs and electronic data transmission and analysis.

There are striking similarities between the activities of the ECR Committee in the 1990's and the Symbol Selection Committee of the early 1970's. The later worked arduously to design, promote and implement the use of the Universal Product Code (UPC bar code). Through careful and numerous contacts and much testing and research a workable UPC was developed, but adoption was slow and painful since stores did not want to invest in scanning equipment before all food packages had a bar code and manufacturers wanted to be sure the bar code would be scanned before they changed their packages to include it. Likewise adopting ECR practices is slow and meeting some resistance. Companies defined as chains (more than 11 stores) have been the most likely to divide products into formal categories (76 percent) and to transmit data to and from suppliers via EDI (68 percent). The average over all companies is 36 and 37 percent respectively. In January 1997 only 13 percent of all companies had adopted continuous replenishment programs and 15 percent were using ABC (FMI, 1997b). A study at the University of Minnesota showed that those stores which had adopted the largest number of ECR practices had the best performance, but the authors cannot tell whether good performance led to adoption or visa versa (Phumpiu and King).

ECR practices are the next major logical step in utilizing the power of the UPC code and

scanning and computer technology. Scanning products upon purchase and being able to change prices in a central computer system and not having to put prices on each item, was a huge productivity boost to the supermarket business in the late 1970's. Since then, few technology breakthroughs or productivity enhancing changes have had as much promise as ECR. If ECR is fully implemented, it will push the industry in the direction of further economies of scale. Savings are promised to consumers who should benefit from a more efficient system. Many are skeptical of this, but as long as there is intense local competition for the consumer's food dollar, savings will probably be passed on to consumers.

ECR practices also lead to new partnerships involving tighter contractual relationships with first line suppliers and distributors. By sharing information about consumers' purchases and preferences retailers can and will have great influence on what foods are produced and delivered through the food chain. Studying the supply chain and how it evolves and performs is one of the new sciences in business schools and agricultural economics departments. Some of the phenomenon being examined are the concentration among producers, the benefits of captive supply, savings from inventory control and product flow, vertical coordination, international sourcing and new-age coops. The later are an example of micro opportunities that arise in niche markets with strong and special demands.

Other Trends

With the increase in food service operations in stores, food safety issues take on new importance. Fresh, unpackaged food is more vulnerable to spoilage and to contamination from handlers. Increased training of food handlers and the establishment of hazardous control programs will increase. Informative labels about nutrition and ingredients is a larger challenge in freshly prepared food.

Continuing to make food more convenient while maintaining freshness, nutrition and taste is an ongoing challenge. The time most consumers expect to spend cooking (assembling) a meal is down to 15 minutes. This means that food must be virtually ready-to-eat when it comes into the home.

The growth of "grocerants", where groceries and ready-to eat meals are both available in the same store, is exciting and helps provide adventure and excitement in the store. It is not, however an economical way to deliver food to middle and lower income households. The formats of retail food stores may bifurcate even further. One of the challenges for public policy makers and for the food industry is to balance competition for the high-end food dollar while also serving the food needs of the poor. As the lines between food for home and away-from-home consumption blur, food stuffs eligible to be purchased with food stamps, or their electronic equivalent, may need to be recategorized.

Home delivery and Internet shopping for food is here and growing. Industry experts predict it

will reach 10 percent of food sales in about 10 years. To be profitable, the technology of filling orders must find a way to bypass the grocery store and receiving deliveries must be more convenient than going to the store oneself.

Demographics and lifestyles dictate that stores will cater to older consumers, provide more services unrelated to food, and find new ways to attract customers on a regular basis. The ideal customer is the one who considers their grocery store to be their cook, kitchen and dining room, a place they feel at home.

More training of labor and finding labor saving technologies (high tech) while maintaining or even increasing the (high touch) service personnel will be critical. Good service is delivered by well trained and friendly people but they add to labor costs which already comprise over 38 percent of the cost of food. (FMI, 1997a)

Keeping prices low, adding services, increasing food safety and customer loyalty are among the vast challenges this industry faces. Part of the solution will be in tighter links to food manufacturers (including commissaries) and narrower specifications on acceptable food qualities and delivery time. This changes the nature of the food delivery system all the way back to the farm. This is a mature business but it has a steady flow of repeat customers. As long as consumers have numerous choices of what to eat and where to obtain their food, competitive forces should ensure favorable food prices and uphold our long tradition of decreasing the portion of household budgets needed for food.

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